SEQUENCE AS A DETERMINING FACTOR OF DESIGN

By Ronald Morgan Binney
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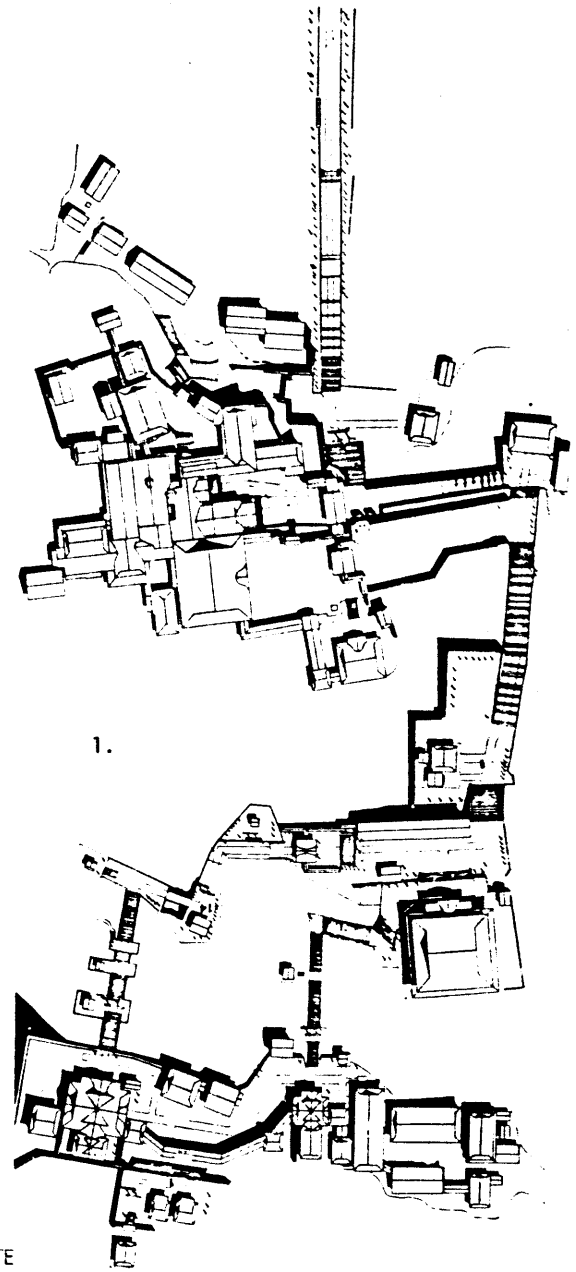

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ABSTRACT

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Submitted to the Department of Architecture on April 17, 1984 in partial fulfillment of the requiremants for the degree of
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This thesis explores perceptual experience as it relates to architecture and its' design. It recognizes the disparity which exists between the inevitable linearity of our experience of buildings, and the fact that buildings and the process of their design are non-linear. This opposition between the sequential nature of architectural experience and the three-dimensional, non-linear reality of the architectural design process, presents a problem; that of understanding and stating concepts of sequential experience in a form that admits directly into the design process. This thesis addresses this problem.

The main contention is that concepts of sequential experience must be tested in the process of design. Only by going back and forth between the hypothesis and its' use can accurate and useful tools of thought be fashioned. Hence, this exploration has two parts; the analysis of sequential experience and the design of a building.

Thesis Supervisor: Fernando Domeyko
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Fernando Domeyko, whose broad and inclusive knowledge of architecture and whose patient and encouraging criticism were invaluable.

Maurice Smith, who over the last several years provided the sound framework without which I could not have moved foward.

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Elizabeth Reed, who provided perspective througout the entire process, and whose knowledge of words and concepts are to a large extent responsible for such clarity which the text exhibits.

INTRODUCTION AND APPROACH

Perceptual sequence as it applies to design, is a subject which has held my interest for a number of years; however, this thesis is my first attempt at a thorough investigation. It seemed to me, from early research, that there must be some method of understanding that would admit easily and directly into the design process. Hence, this search began. It is an attempt to find factual principles of sequential experience, and to state them in a form that can be used in design. The allotted time has been small, so I am sure that there are omissions. However, I am reasonably confident that the perception and logic are correct. For mistakes I apologize.
For the attempt I do not.
It seems it's always easier
to approach perfection in what we already know.
There is a saying I just made up: A pencil sharpener can't make a pencil; it can only sharpen it. That's where the word comes from. Get it?- pencil sharpener.
Words are concepts but they're not the thing. Words are different from the thing. You've got to know the thing. Now, a pencil without a point is useless for its intended purpose. So, if I didn't know what a pencil was and I read somewhere that a pencil was for writing, and I were given a brand new pencil-- they always come without a point, you know,-- I might conclude that it was for picking my ear and never associate it with writing. Now, thinking this was an instrument for ear picking, I might see someone stick this picker in a pencil sharpener-- remember, I don't know a pencil from a pointer-- he then turns the crank and a pointed pencil emerges. Now I am faced with a dilemna: Is this a picker with a point or a point on a pencil:
The purpose of all of this is to show that our conceptualization of a thing is not the thing. Hence, the correct concept is the one that works. It is for this reason that attention to the word conceptualizations and the design work has gone back and forth. Hopefully each has helped to determine the other.

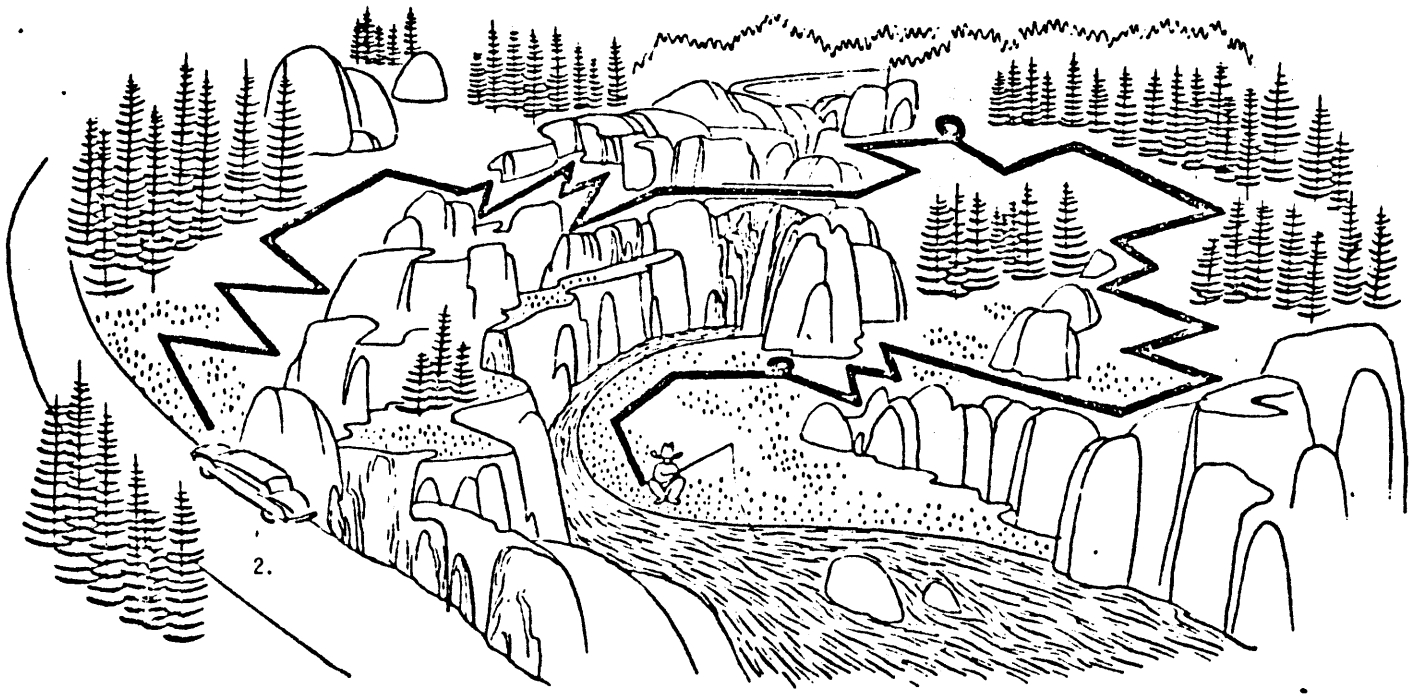
Any discussion about architectural sequences must build upon the work of two authors, Gordon Cullen, "Townscape" (Architectural Press, London,, 1961) and Philip Thiel's published articles and unpublished manuscripts (listed in the bibliography).

Gordon Cullen's book, while not intended to be exclusively concerned with sequence, is nevertheless filled with examples and thought provoking ideas on the subject. While he does not offer any structure for these, the value of his thoughts on perception and vision can not be overstated.

Philip Thiel's work, in contrast, is very much involved with structuring concepts of perception. Much of his thought is an attempt to fit these concepts into a system of sequence notation. The aim of this notation is to record or program sequential experience.

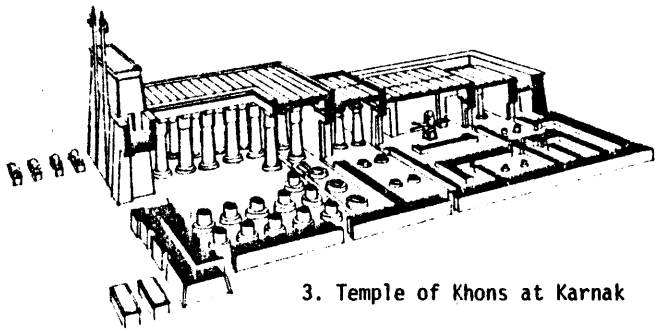
I believe that anyone interested in sequence as it affects design must study these authors carefully. Their thoughts permeate this thesis; however they have been added to, edited, changed, and rearranged to such an extent that, except where noted, it is now impossible to sort them out. Hence, I have not felt compeled to cite chapter and verse throughout the text.

SEQUENTIAL EXPERIENCE



THE INEVITABLE EXPERIENCE

The sequential nature of our experience of buildings has been recognized, to varying degree, throughout history. Amoung those who used this understanding to advantage we may include designers of certain examples of traditional Japanese architecture, and the builders of Egyptian temples. The temple of Khons at Karnak is a good example.



3. Temple of Khons at Karnak

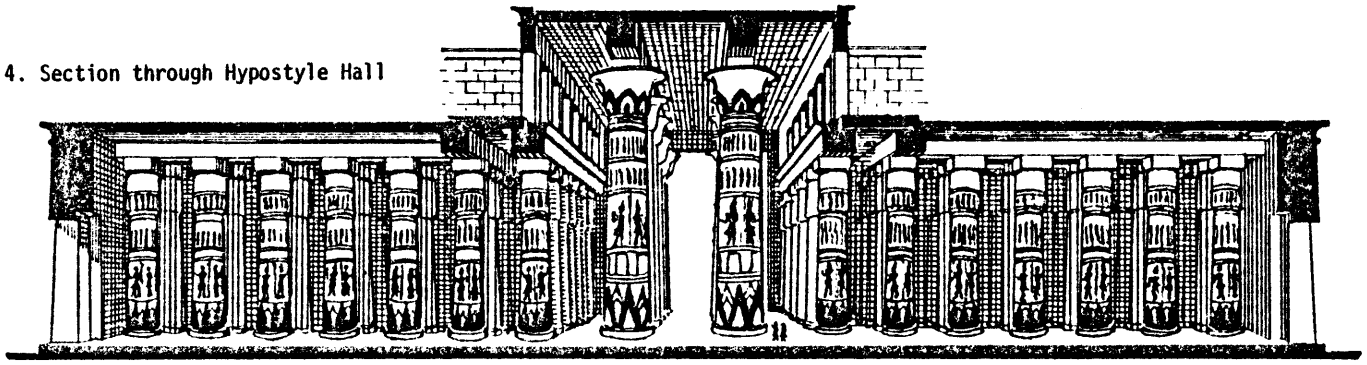
Typical of its' period, it was laid out on a central axis along the path of the sun. Each element marked a stage in the ritual progression of the priests toward the mysteries in the sanctuary. The stone pylon entrance portal was a sign of exclusion to all but the selected priests. The forcourt followed, restricting outside space and light. The progression then moved into the Hypostyle Hall, which was raised a step and further restricted light and space. Here, light was admitted only through clerestories which ran adjacent to the path and axis, leaving the side isles dark. The sanctuary which terminated the path was raised another step with light focused only on the main alter. The total sequence, with its' gradual reduction in space and light. provided a slow transition from the outside world to the inward focus of the sanctuary. The form

of the light must have produced a sence of mystery unsurpassed by the best Hollywood film set designers.

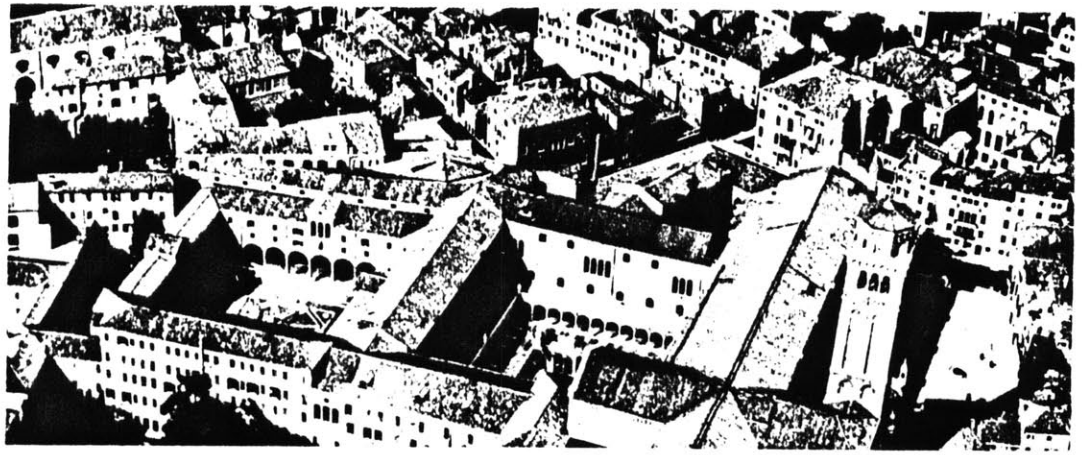
This example points to the enriched effect which an understanding of perceptual sequence may produce. This is a unique aspect of architecture for several reasons. The first of which has to do with scale. When one refers to a building or town a range of sizes comes to mind. At the small end of the range we might think of a typical house. In the middle, we might include groups of small buildings or medium to large size public and commercial buildings. We might limit the large end of the range with the city.

There is one thing common to all sizes, the built environment can not be totally perceived simultaneously. Its' scale requires that we spend time moving around it and through it. A view of the facade of a building, which can be perceived in an instant, is but a small part of the total experience of that building. A more complete perception must be in the form of a temporal sequence. This process will occur regardless of our consideration or neglect as architects. Through an understanding of the process of perceptual sequence and knowledge of its' application in design, we can produce better and more meaningfull environments.

4. Section through Hypostyle Hall



A UNIQUE PHENOMENON



5.

It is the scale of the architectural field which obliges us to experience it as a temporal sequence. This fact sets architecture apart from other visual media such as painting and sculpture. The last two are small; perceivable, though not necessarily understandable,in a short fragment of time. With some exceptions motion plays a small role. Typically these media are viewed, not moved through. There are, however, media other than architecture in which motion plays an integral part.

Film is one visual medium in which motion, and therefore sequence, is of major concern.

Music and dance are also intrinsically involved with this phenomenon. However, in all three of these cases, it is the medium itself which moves. The observer remains relatively motionless. This is not the case with architecture.

There are two aspects of the architectural environment which together make sequence unique. First, the scale obliges motion in a temporal order. Secondly, it is the observer who must move while the medium remains stationary.

SEQUENCE COMPONENTS

6. The exciting public space

Any architectural sequence experience has three major components. These include:

an observer,
an architectural field,
and a resultant meaning.

The observer brings to the sequence experience his senses, especially vision. He also brings consciousness with its socially conditioned responses and past associations with elements contained in the sequence or with the specific sequence itself. The observer also initiates, stops, maintains, and partially controls the sequence by providing motion. Some assumptions and groupings will enable a simplification of this list of perceptual items. While other senses are sometimes important to the experience of a sequence, it is vision with which we are primarily concerned. The three perceptual tools which the observer provides are: vision
mind
motion

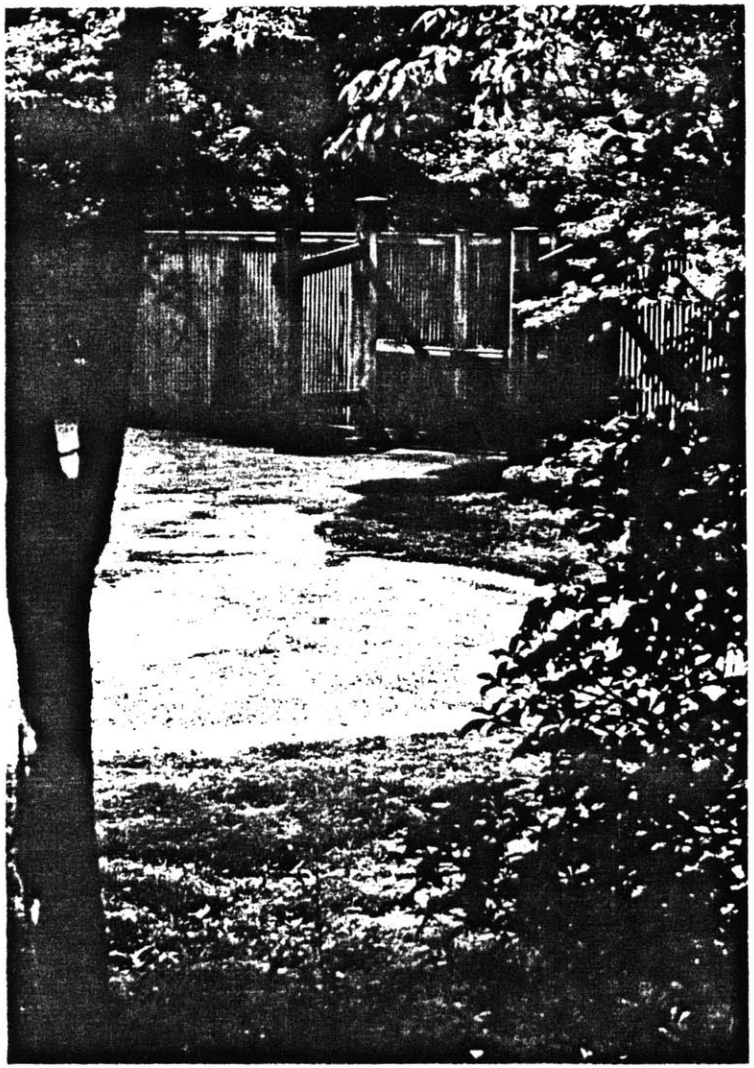
The architectural field provides to the sequence experience the three dimensional distribution of surfaces, screens and objects- the elements of which it is built. It also provides the form and distribution of the spaces, light, and views which the building elements define. Through its organization, the field also sets up a limited number of possible orders in which these elements may be experienced.

Meaning is a result of the interaction between the observer and the architectural field. The field provides the stimulation and clues. The observer perceives, correlates and transforms these. Meaning results when the clues and perceptions correspond.

Meaning may take several forms ranging from practical concerns to philosophical conceptions. In the practical sense, orientation is of constant and major importance. Within the field we must provide clues enabling the observer to assertain where he is, where to go, how to get there, and where to stop. Also at the practical level, we must be concerned with indications of use. Spaces and elements must provide indications of their present use, occurance of past and future events, for whose use they are intended, and how to use them.

Meaning may take the form of an intensification or evocation of an emotional reaction or an emotional state. We are all familiar with the courtyard or private garden which encourages a feeling of calm and privacy. There is also the crowded public space that produces a state of excitement and anticipation.

7. The private garden

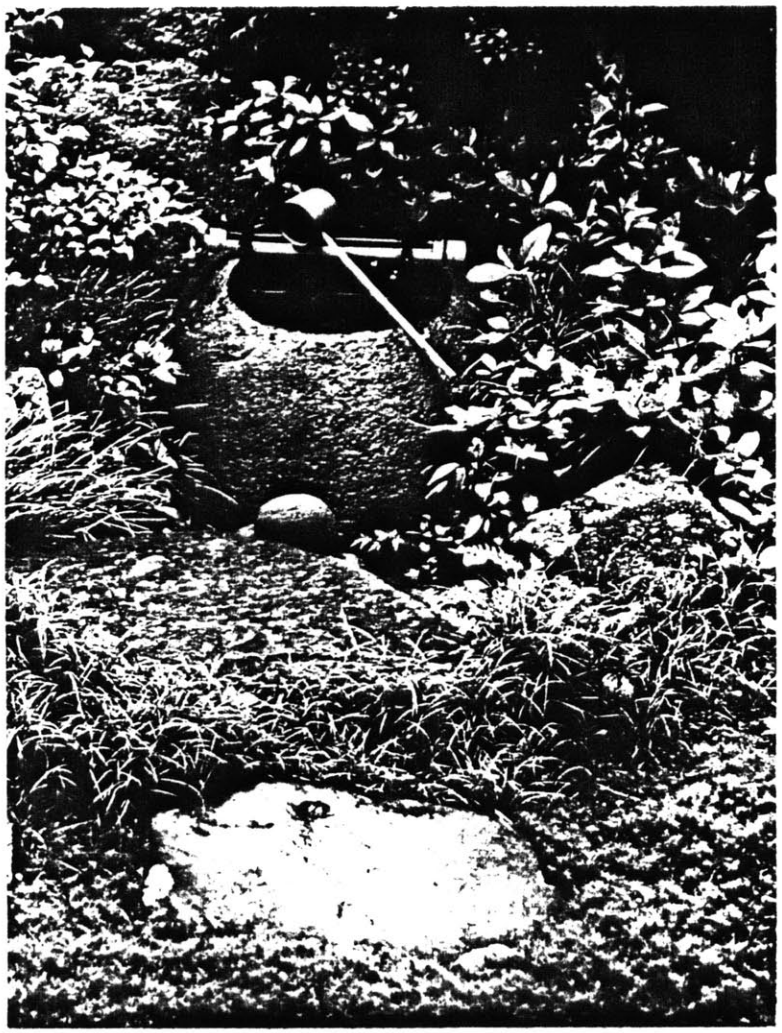


Meaning at the philosophical level is well illustrated with this example from Jiro Harada,

"When his new tea-room and garden were completed at Saka, he invited a few of his friends to a tea ceremony for the house warming. Knowing the greatness of Rikyu, the guests naturally expected to find some ingenious design for his garden which would make the best use of the sea, the house being on the slope of a hill. But when they arrived they were amazed to find that a number of large evergreen trees had been planted on the side of the garden, evidently to obstruct the view of the sea. They were at a loss to understand the meaning of this. Later when the time came for the guests to enter the tea-room, they proceeded one by one over the stepping-stones in the garden to the stone water basin to rinse their mouths and wash their hands, a gesture of symbolic cleansing, physically and mentally, before entering the tea-room. Then it was found that when a guest stooped to scoop out a dipperful of water from the water-basin, only in that humble posture was he suddenly able to get a glimpse of the shimmering sea in the distance by way of an opening through

8. Planting on the side of the garden to obstruct the view

9. Stone water-basin



the trees, thus making him realize the relationship between the dipperful of water in his hand and the great ocean beyond, and also enabling him to recognize his own position in the universe; he was thus brought into a correct relationship with the infinite."

An analysis of this sequence will reveal how and why it works. The guests in this example supply two necessary ingredients. They bring prior knowledge of the ritual of the tea ceremony. They also supply motion, since in this case it is only by motion through the architectural field that the latent meaning contained therein may be realized. The field sets up anticipation and revelation.

Anticipation is achieved through the use of the trees, which block an overall view of the sea. However, they do not erase prior knowledge that the sea is there, nor do they block the sound of the sea. Revelation is achieved through a specific and controlled view, from a specific point associated with a certain use known to the observers. In a more general sense, comprehension of the meaning of this sequence depends on the revelation

of a controlled view at a specific point in a dynamic sequence. In a static sense, the space occupied is juxtaposed to an outer space through a controlled view.

10. Glimpse of infinity through the trees

DEFINITION AND DISPARITY

The philosopher Freidrich Von Schelling called architecture "music in space... a frozen music." However, as Thiel points out "doubtless the analogy ... was felt to exist in terms of the rhythmetrical patterning of the formal elements of the facade..." At this point I believe we may make two statements:

Spatial sequence may be defined as the linear experience over time, of an observer moving through a three-dimensional field of elements deployed in space.

Architecture may be described as a three-dimensional, non-linear field of elements deployed in space such that, when an observer sequentially moves through it, the latent meanings contained therein are actuated.

The former statement is based on the experience of Architectural space. It is a linear experience. In describing it, we must do so in a sequential fashion. If we were to design a sequence, it would take a linear form.

The latter statement describes a three-dimensional field containing the potential for sequential experience. The field itself is non-linear. We could not possibly describe it in a linear fashion. In order to design it, we must use non-linear means.

Hence, in order that the sequence experience be contained in the architectural field, we must make a cognitive leap from designing the sequence to designing the building. We must fashion tools and concepts to accomplish this.

RELATIVITY OF SCALE AND SPACE

We are all familiar with the phenomenon of the relativity of scale. For instance, a single farmhouse,when viewed from far away, may be perceived as an object. When standing next to it, ones perception may be of a surface. Once inside, however, it may be perceived as architectural space. In this example our perception is a function of distance.

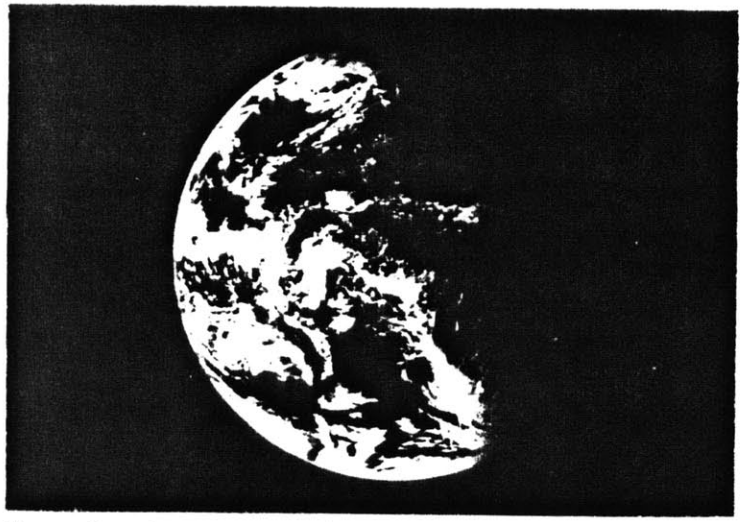
The relativity of scale applies to all measurable attributes of the built environment, when regarded in relative terms. Measurable attributes include:

- dimension
- size
- distance
- velocity
- quantity
- time

11.

The relativity of scale seems to govern our perception of all the elements, attributes, and concepts of the built environment. For instance, a change in distance may transform our perception from that of space to surface, or surface to object. This will generally hold true regardless of formal attributes. The most spatial and associative building or landscape, when isolated and experienced from a great distance, is perceived as an object. A change in quantity

12. A. The surface close-up.

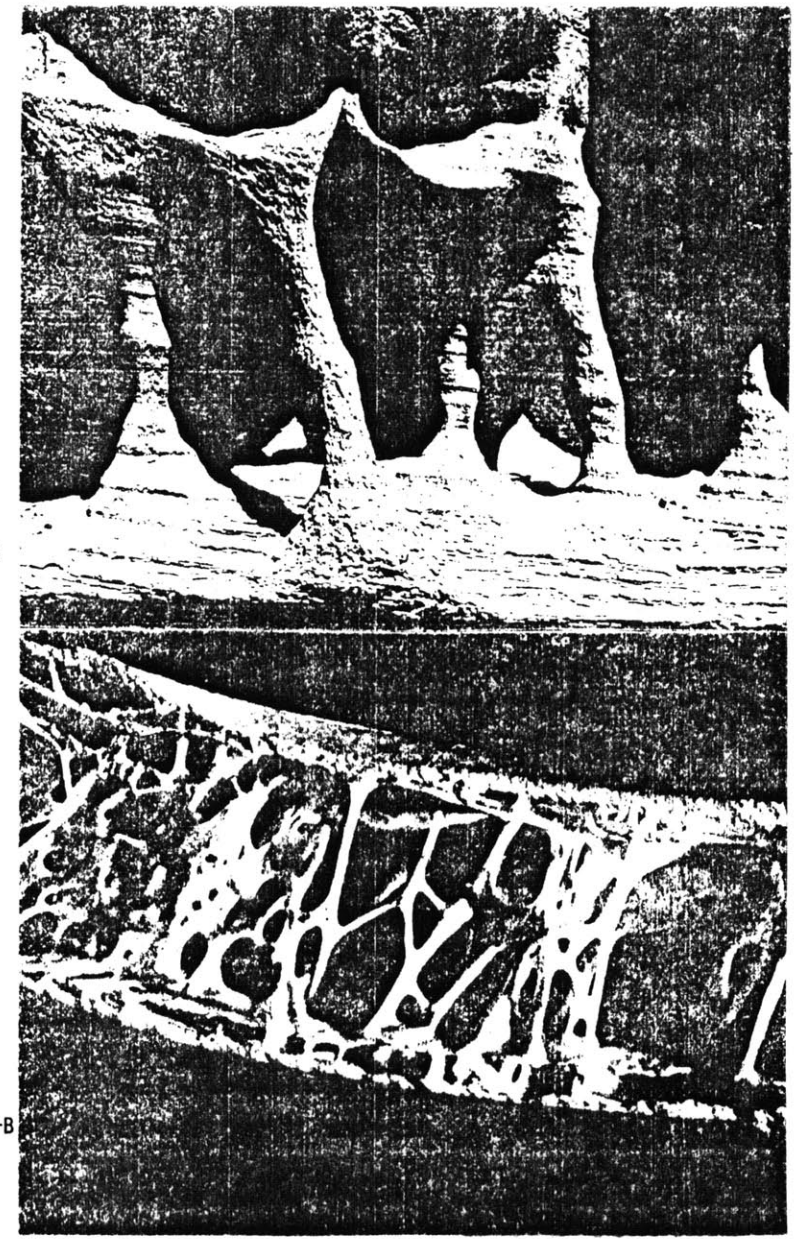


The surface from a distance.

may transform an object to a screen. A change in velocity may change our perception from one of dynamic motion to one of static rest. Of course there are practical constraints which may limit the extent to which the phenomenon of relativity of scale may operate. For example, in a particular context, it may be impossible to put enough distance between ourselves and a particular building to ever experience it as an object. An element or object, although it may possess spatial qualities, may be of insufficient size to be perceived as space. We can now point out another unique aspect of the built environment.

In addition to the unique aspects of sequential experience mentioned previously, architecture possesses another unique quality. It is always perceivable as space. This fact may or may not be used to advantage in a particular building. Nevertheless, we typically do not create the illusion of space; we create space, good or bad. Of all mediums, architecture is the one that owns the third dimension.

13.



B

A+B

14.

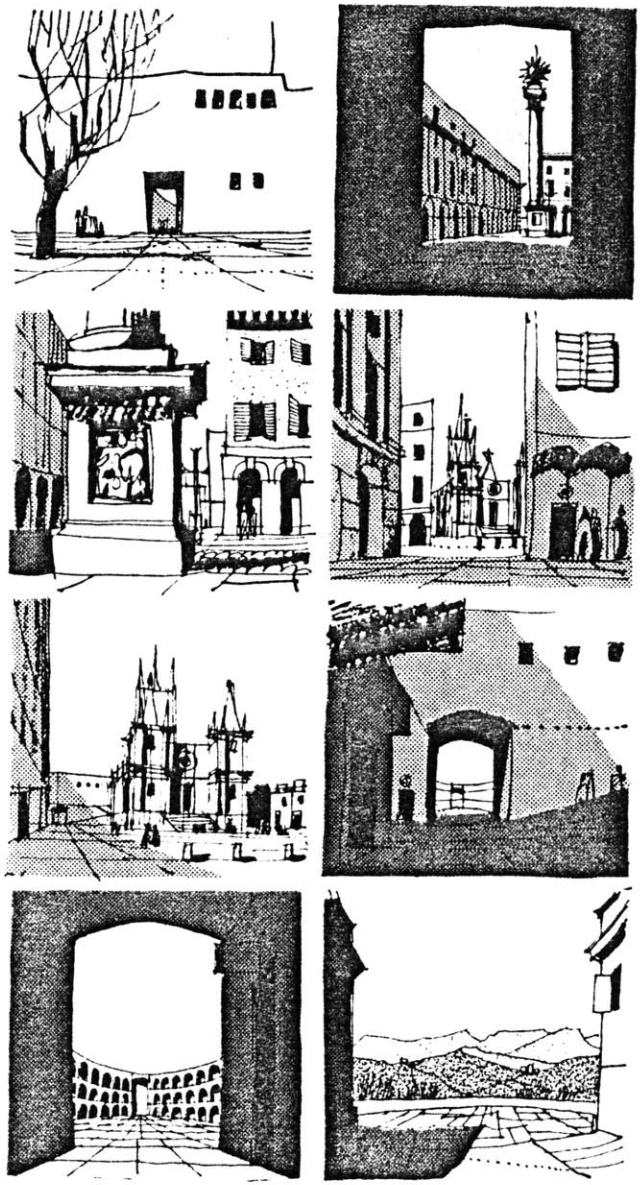
SEGMENTAL EXPERIENCE

There is an attribute of the distribution of the architectural field which will help to reveal how the relativity of scale directly affects motion and sequential experience. An example from Gordon Cullen will serve to illustrate:

> "Let us suppose that we are walking through a town: here is a straight road off of which is a courtyard, at the far side of which another street leads out and bends slightly before reaching a monument. Not very unusual. We take this path and our first view is that of the street. Upon turning into the courtyard the new view is revealed instantaneously at the point of turning, and this view remains with us while we walk across the courtyard. Leaving the courtyard we enter the further street. Again a new view is suddenly revealed although we are travelling at a uniform speed. Finally as the road bends the monument swings into view. The significance of all this is that although the pedestrian walks through the town at a uniform speed, the scenery of towns is often revealed in a series of jerks or revelations".

We can see from this illustration that views and spaces are very often experienced as discrete

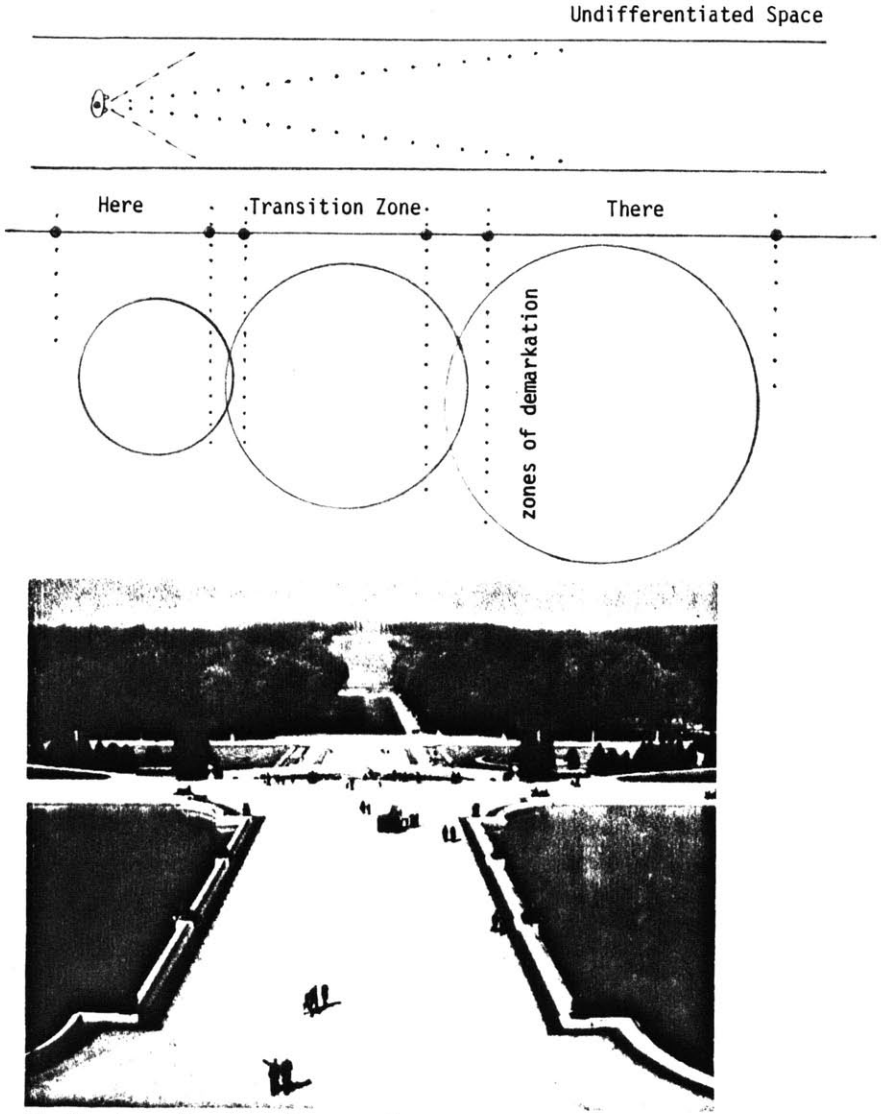
15. Segmental Experience



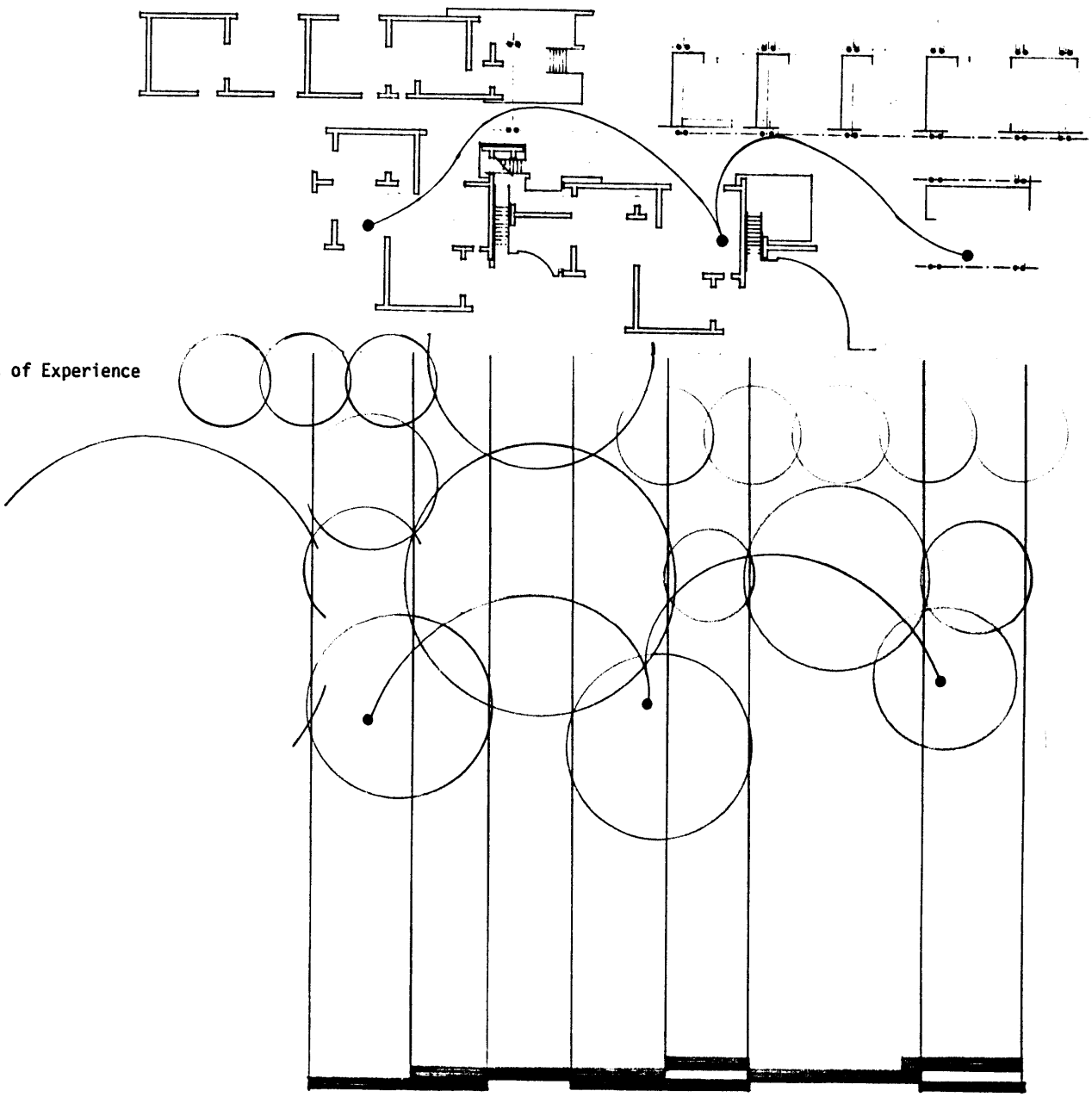
To walk from one end of the plan to another, at a uniform pace, will provide a sequence of revelations which are suggested in the serial drawings opposite, reading from left to right. Each arrow on the plan represents a drawing. The even progress of travel is illuminated by a series of sudden contrasts and so an impact is made on the eye, bringing the plan to life (like nudging a man who is going to sleep in church). My drawings bear no relation to the place itself; I chose it because it seemed an evocative plan. Note that the slightest deviation in alignment and quite small variations in projections or setbacks on plan have a disproportionally powerful effect in the third dimension.

segments in time. The town or building may be a unified whole but is revealed in segments of experience.

The way in which our faculty of vision operates reinforces this phenomenon of segmental experience set up by the architectural field. In the previous example given by Cullen, there are explicit if not abrupt transitions between the spaces and views we encounter along the chosen path. In this same imaginary town, if we were to choose a path down a long straight avenue, these explicit transitions would not exist. The transition between where we were, and where we were going would be gradual and undefined. However, our faculty of vision seems to make the separation between here and there for us. At one instant in time our eyes can focus on the distant view or the immediate surroundings but not both, nor do we normally shift our focus rapidly from one to the other. The implication here is that while the avenue is formally one long directional space, physiologically our vision creates two, a here and a there with an undefined transition zone between them. We may term this segmental vision. Through the phenomena of segmental experience and segmental vision we can conclude that any architectural sequence consists of a series of recognizable segments.



16. The long directional space divided at Versailles



Segments of Experience

STATIC AND DYNAMIC SCALE

The relativity of scale has particularly important ramifications as it applies to motion. Our experience of an architectural sequence may be said to occur through motion over time. At any point during this sequence we may stop our motion. However, time continues, and so does our experience. Hence, our experience occurs at two scales. We may term them the dynamic scale and the static scale. The dynamic scale requires that motion and time continue. The static scale requires only that time continue.

Since at any point in a sequence we may stop, the dynamic scale may at any point become static. Thus, the static scale is always contained within the dynamic scale. The dynamic scale experience can be said to consist of:

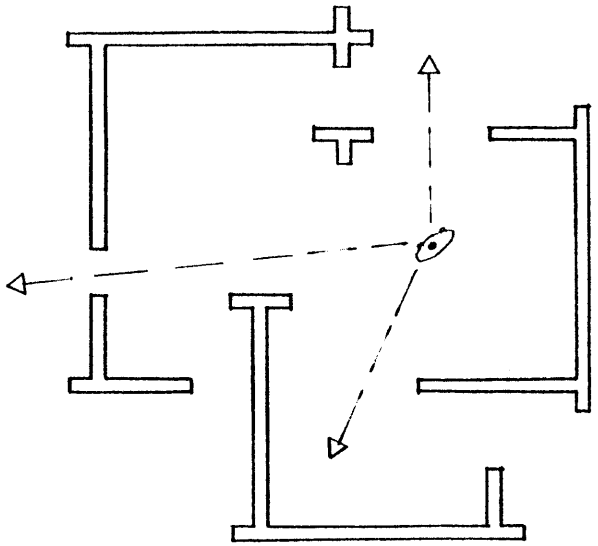
the sense of motion of self
the apparent motion of the field
the static scale experience

This is born out of our direct perceptual experience of moving through an architectural field. We are aware of our own motion and also the apparent motion of the architectural elements as we pass through space. In addition we have an awareness of the segment of space by which we are contained. This last awareness is not unlike that which we would have at the static scale.

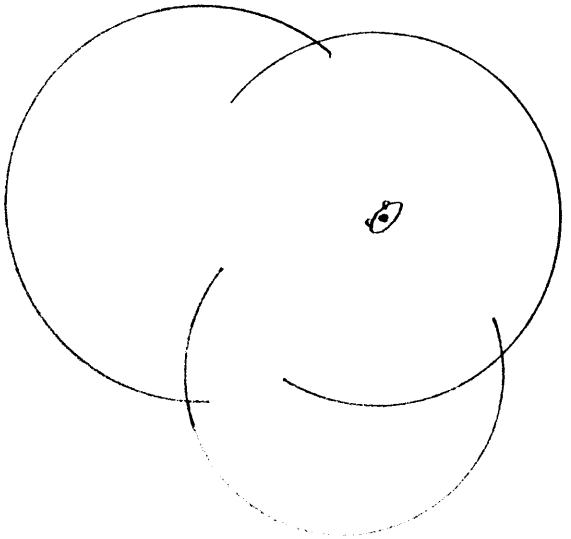
Since the motion to which we are referring occurs within an architectural sequence, at any point at which an observer might stop, he would find himself in a place with a specific identity. Thus, we can equate static scale with specific segment and term the result a static sequence. We can also say that a dynamic sequence consists of a series of static sequences.

The preceeding arguments have a purpose. In order to design an architectural field which considers sequential experience, we need not be concerned with the calculus of time. We do not have to know the observers' perception at any and every point of time and position along a path. Rather, we are interested in recognizable segments of time or segments of experience. Specifically, we design static sequences and dynamic sequences.

The terms "static" and "dynamic" are relative terms. For our purposes as designers, we may say that an observer is experiencing a static sequence during the span of time he confines himself to one segment of an architectural field. The segment of the field may be a room, or a defined area within a larger space. A small amount of motion may occur. He may turn his head or even walk casually about the space. His perception is involved with where he is and what he can view from there. There are two distinguishing characteristics of a static sequence. First, all the elements which form the observers' perception are immediately comparable. He need only turn around to review any or all elements. Second, his experience is not involved with sustained motion through a series of spaces.

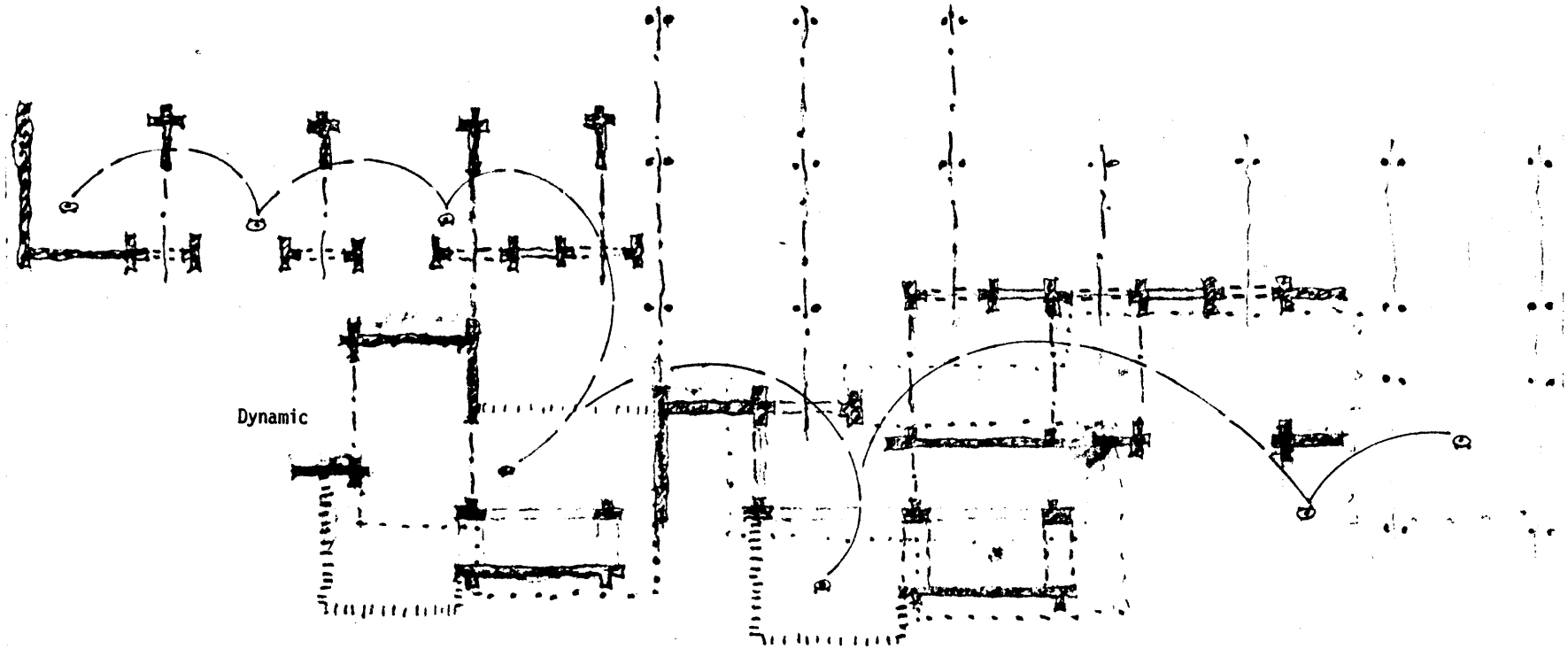


Static



An observer experiences a dynamic sequence when he is engaged in sustained motion through a series of segments of an architectural field. Since the term "dynamic sequence" is relative, it applies even if the observer stops along the way. Its distinguishing characteristics are that the observer is involved with sustained motion and that he must use his memory to compare the elements which contribute to his experience since he can no longer review them all visually.

There are two ways in which we may define the relationship between static and dynamic sequence. We may say that the static sequence is contained within the dynamic. We may also say that the dynamic sequence is composed of a series of static sequences. The definition we choose depends on our purpose.



RELATIONSHIP
JUXTAPOSITION AND SEPARATION

Upon reflection it becomes apparent that there are only two types of relationships we can affect among architectural elements. One is to juxtapose them, the other is to separate them. In designing an architectural field we can juxtapose or separate any of the elements previously identified. We can also speak of an architectural field as having juxtapositions and separations of these elements. As previously stated, however, our perception of the field is linear; the field itself is non-linear. Hence, our experience of relationships may be different from the relationships as they exist in the field. For this reason, we must constantly distinguish between the perceptual experience of relationships and the act of designing or making relationships.

Relationship in a static sequence is concerned only with what can be experienced simultaneously. This is in keeping with our definition of static sequence. In a static sequence we are limited to juxtaposition alone. Although elements may be physically separate, if they are within view we experience a juxtaposition. Experience of a separation requires dynamic motion, which is not part of a static sequence. Hence, an element which is separated from a static sequence is no longer part of the experience and is thus excluded.

It is through juxtaposition that we give life and vitality to a static sequence. Obviously any two elements brought together exhibit one of two qualities: sameness or difference. It seems to make little sense

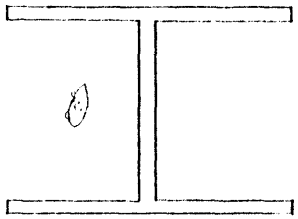
to compare sameness unless the result of this comparison is eventually used in the juxtaposition and intensification of a difference. It is through the juxtaposition of differences that we may visually define what an element is by revealing what it is not. For instance, in a static sequence, if we juxtapose an indoor enclosed space with an outdoor exposed space, and provide a visual continuity between them, we simultaneously put in the mind of the observer two places. The mind reacts in a deep sense to this contrast. Where we are is made more meaningful by seeing where we are not, and the enclosed space seems more enclosed by comparison to the one which is exposed. Gordon Cullen alludes to juxtaposition of differences and points out some of the elements and results which follow:

When we juxtapose	we give meaning to:
This and That	an object, screen, surface
Here and There	a space or place
Bright and Dark	the light
Near and Far	distance
Large and Small	size
Exposed and Enclosed	our sense of position
In and Out	" " " "
Above and Below	" " " "
On and Under	" " " "

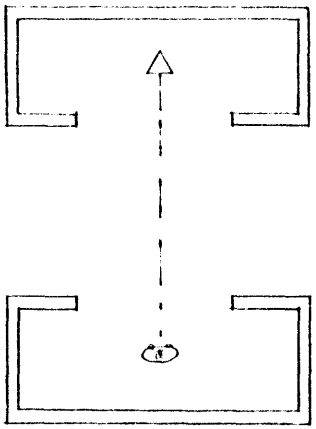
Regarding this chart, there are several points which should be made. It may be noted that view is conspicously missing from the list of what may be juxtaposed. Strictly speaking, in a static sequence we cannot juxtapose view as an element itself. View is the medium of continuity by which all of these comparisons are made, since at the static scale the observer is confined to one segment of experience. It is through visual inhabitation of the space which we are not in, that meaning is given to the space which we do occupy. If we say we are justaposing two views, we are in reality juxtaposing two things or spaces through view. We cannot have a view of nothing. The type and configuration of the formal definition we provide yields the specific quality of the visual transition. In practice, we juxtapose the enclosed in-space with the exposed out-space and then through the form, size and quality of the visual exchange we make between the two; we set up the visual transition.

We must at this point take notice in the chart of the distinct characteristics of our sense of position. The word as Cullen uses it and as we will use it, refers to the emotion-intensifying aspect of sensing our location with respect to the immediate segment of the architectural field we inhabit. This differs from orientation, which concerns our practical need to know where we are with respect to the overall field, in order that we may know where to go. Position and orientation are, however, directly linked. For instance, if in a static sequence we place the observer up and we provide a direct view to a space that is down, we intensify his position, his emotional sense of being up and exposed; we thus directly orient him to where he is within the overall field; and, as Cullen mentions, we create a stronger sense of place. Hence, the associative space is made alive and virtually dynamic.

@ STATIC SCALE

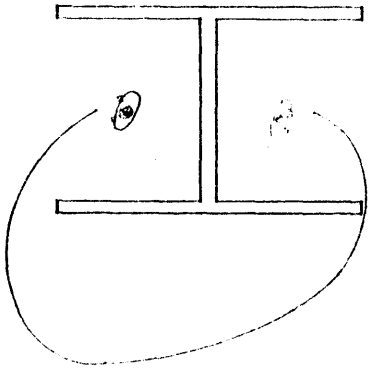


Two spaces separated by a wall. The unoccupied space is outside of the observers' perception at the static scale.

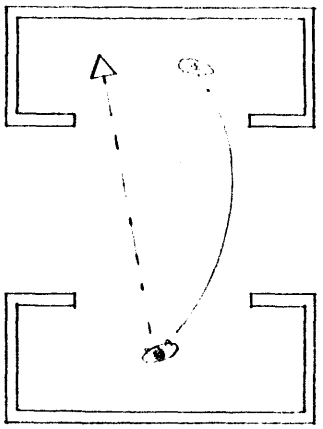


Two spaces separated by distance. Through view, they are juxtaposed at the static scale.

@ DYNAMIC SCALE



Through motion we can experience a separation at the dynamic scale.

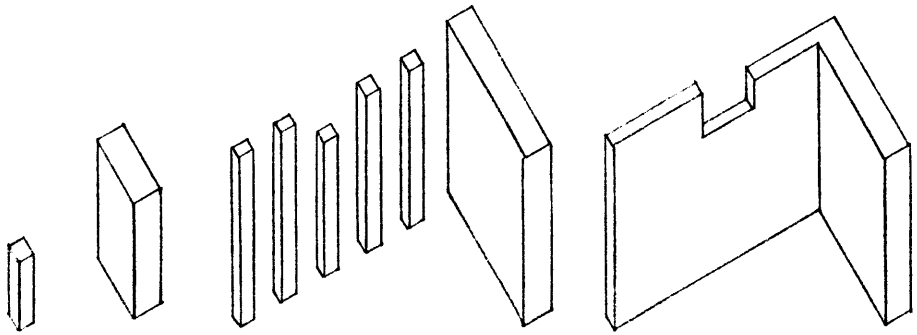


Through view we experience juxtaposition.
Through motion we experience separation.

At the dynamic scale, we can experience both juxtaposition and separations. This is made possible by motion which enables us to experience elements which at the static scale were outside of our perception. Hence a dynamic sequence consists of:

- the static experience of juxtaposition through view
- the dynamic experience of separation through motion

SEQUENCE ELEMENTS



Objects Screen Surface

In order to design an architectural field which considers sequential experience we must not only understand ones experience of a sequence, we must also know what we may use to make the sequence. We must know what elements may be sequenced. A building is large and complicated and is composed of many elements with many possibilities for their relationship. It is not a simple task to isolate the ones we need. Nevertheless, we must do so. Our elements must be real in that they must actually exist, if implicity. They must possess a hands on quality. In addition, they must facilitate three dimensional, non-linear assembly and must promote linear sequential thought.

Philip Thiel, in his published article, 'A Sequence Experience Notation', has identified one group which we may term physical elements. Physical elements consist of:

- objects
- screens
- surfaces

Maurice Smith, in 'Fragments of Theory', has enumerated the range of this group in more detail as well as identified their behavioral attributes. However, for the sake of brevity in this discussion, we will use Thiels' group. It is obvious that surfaces, screens and objects, in all their infinite variations and combinations, are the stuff that buildings are made of. We can also draw them on paper without much abstraction.

Attributes of the physical elements, further define their unique identity. These are:

- position
- direction
- quantity
- shape
- color
- texture

In the next group of elements are:

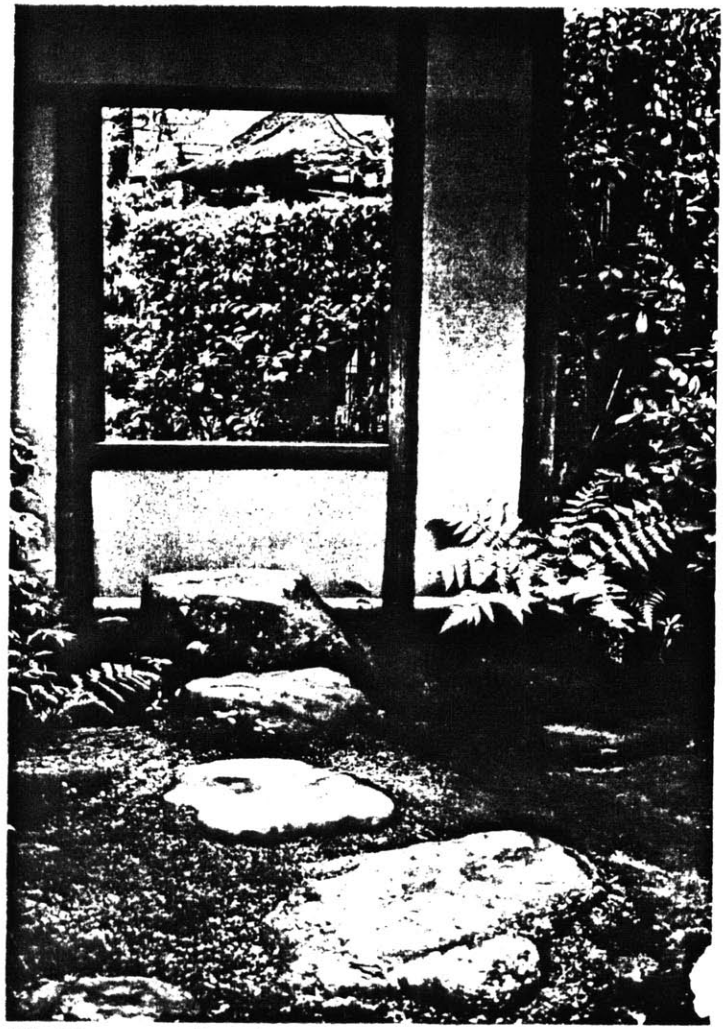
Space

Light

View

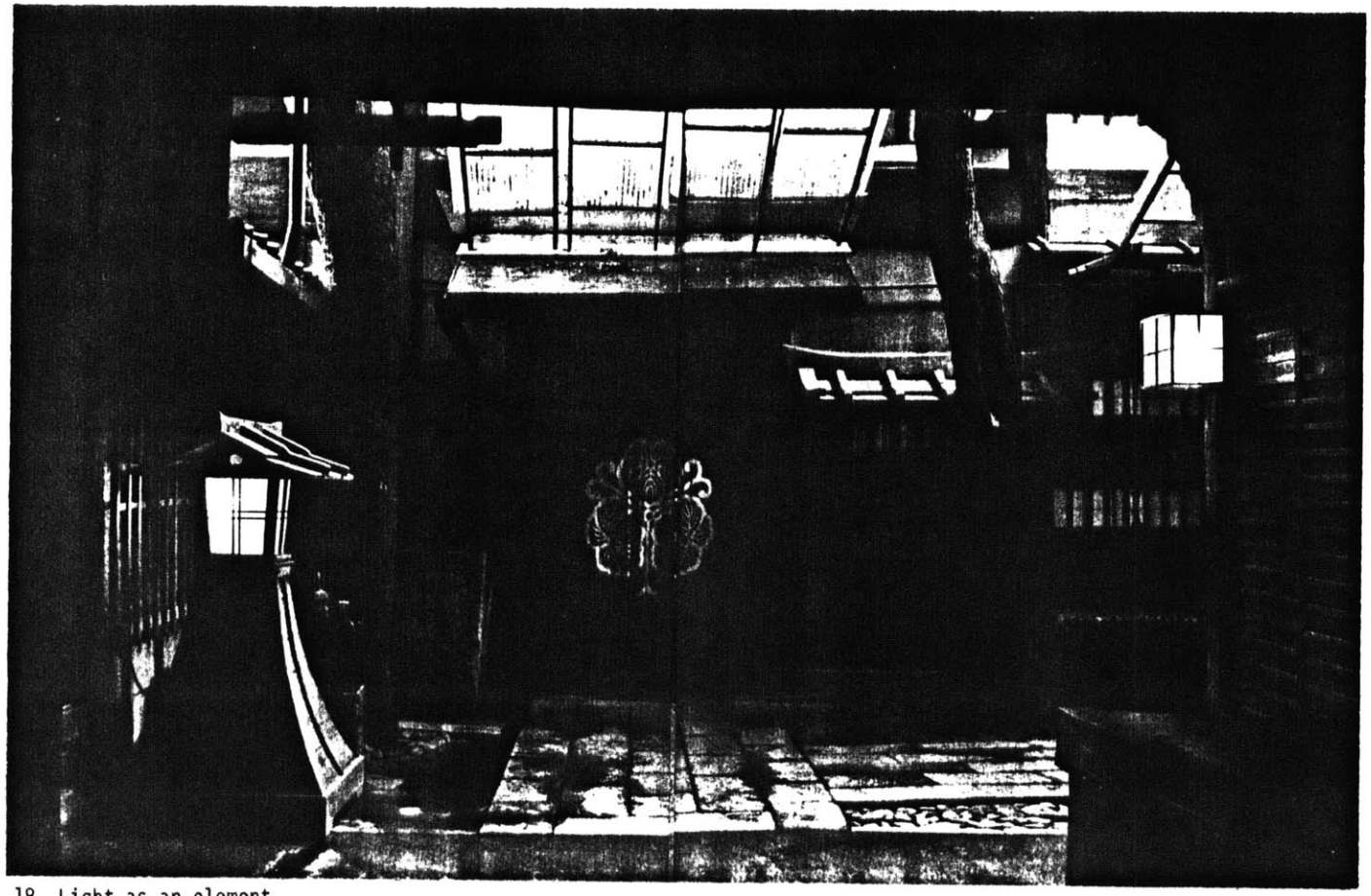
These are directly defined by the configuration and systematic deployment of the physical elements. Strictly speaking, these elements do not exist, in an architectural sense, without the physical elements. Nevertheless, we can and often do draw them directly as abstractions. They are equal in importance, and sometimes more important, than the physical elements themselves since their form is often more readily perceived.

In an architectural sense, view is closely tied to light. However, they are not the same thing. Very often view may vary while the light remains the same. Hence, we must consider view to be a distinct element which may be sequenced apart from the other elements.



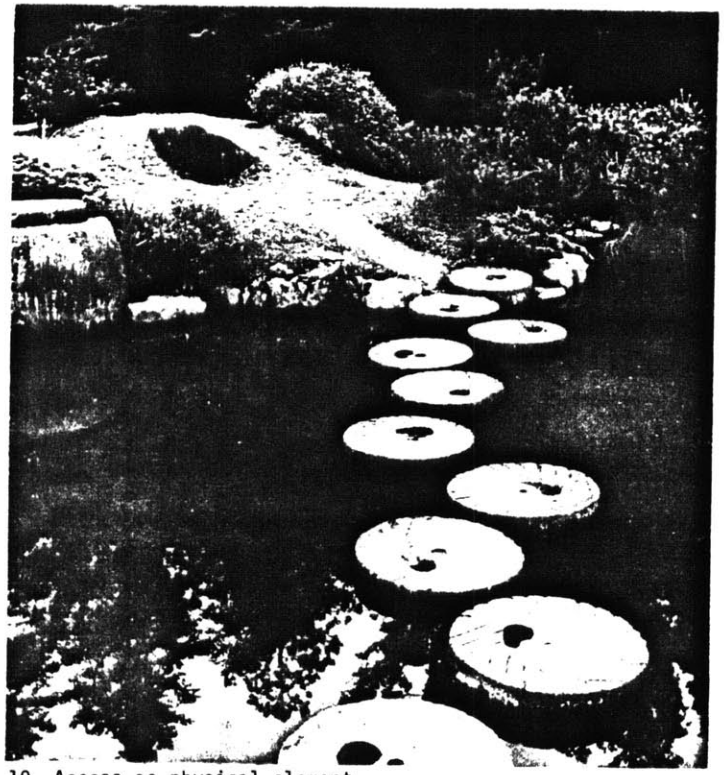
17. View as an element

The physical elements and their configuration may be said to absolutely define space. However, we cannot visually perceive these elements without light. If light were always uniform we might discount its importance; however, its quality varies. Sometimes it is diffuse and sometimes direct. Usually it is a combination of both. The architectural field receives and transforms light. Hence, when we build the physical field we also build the light. In order that the light not be relegated only to what is left after the physical elements have been placed, we must realize that light has positive form and may be sequenced.

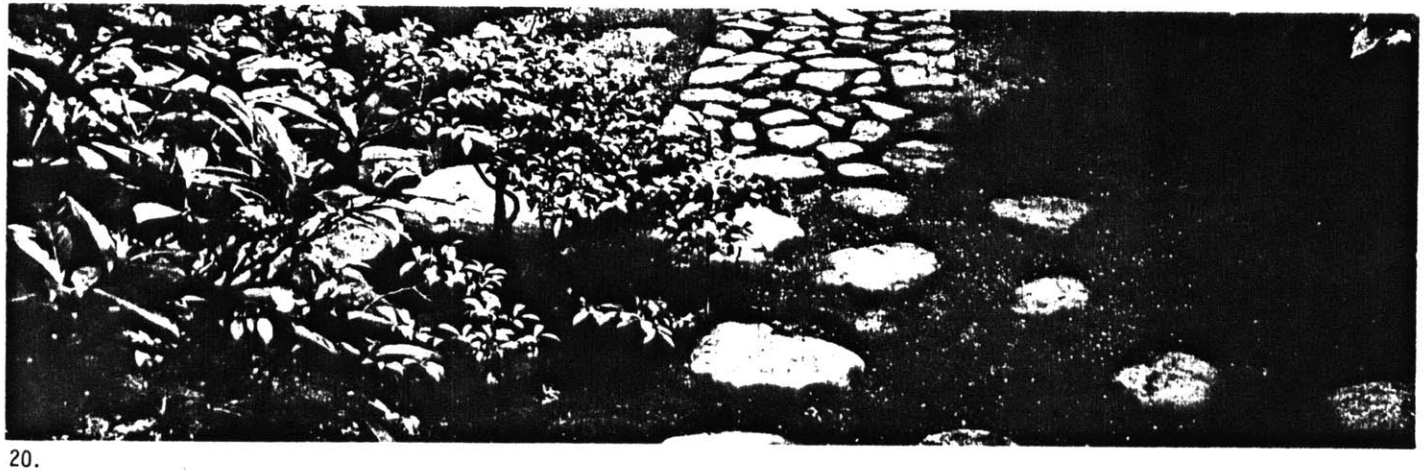


18. Light as an element

Maurice Smith, in 'Fragments of Theory', identifies access as an element. In a dynamic sequence it predicts future movements and may give clues to the order in which they can be experienced. As designers, we may at times think of it as synonomous with the sequence or sequence system. The access may sometimes be drawn directly. At other times it may be defined by the edges of the physical elements, or become a physical element itself. The access, whatever its' definition, represents a zone of experience, sometimes wide, sometimes narrow, but never just a line of motion.



19. Access as physical element



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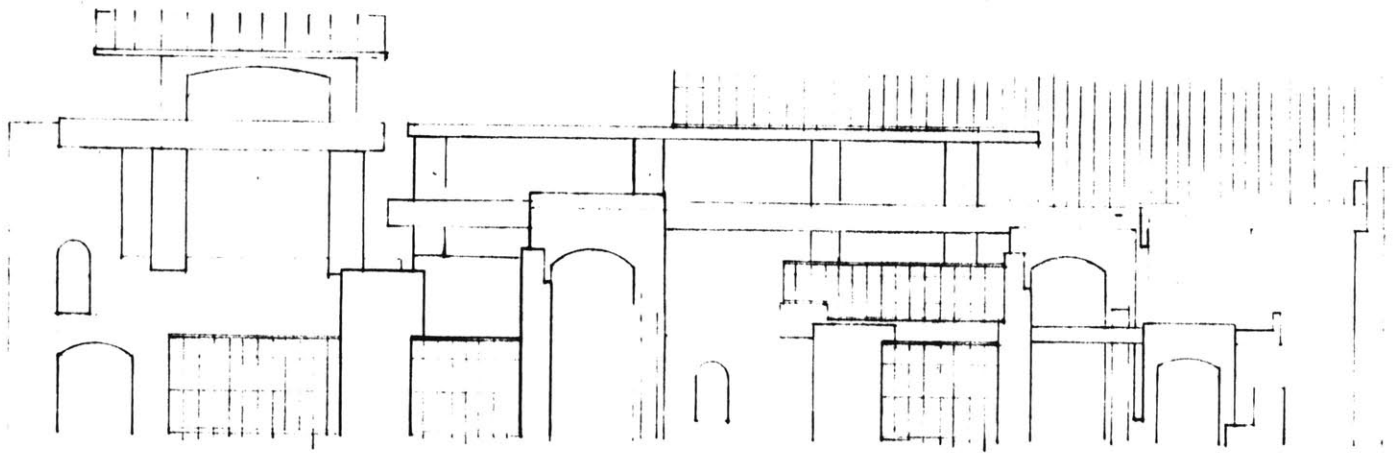
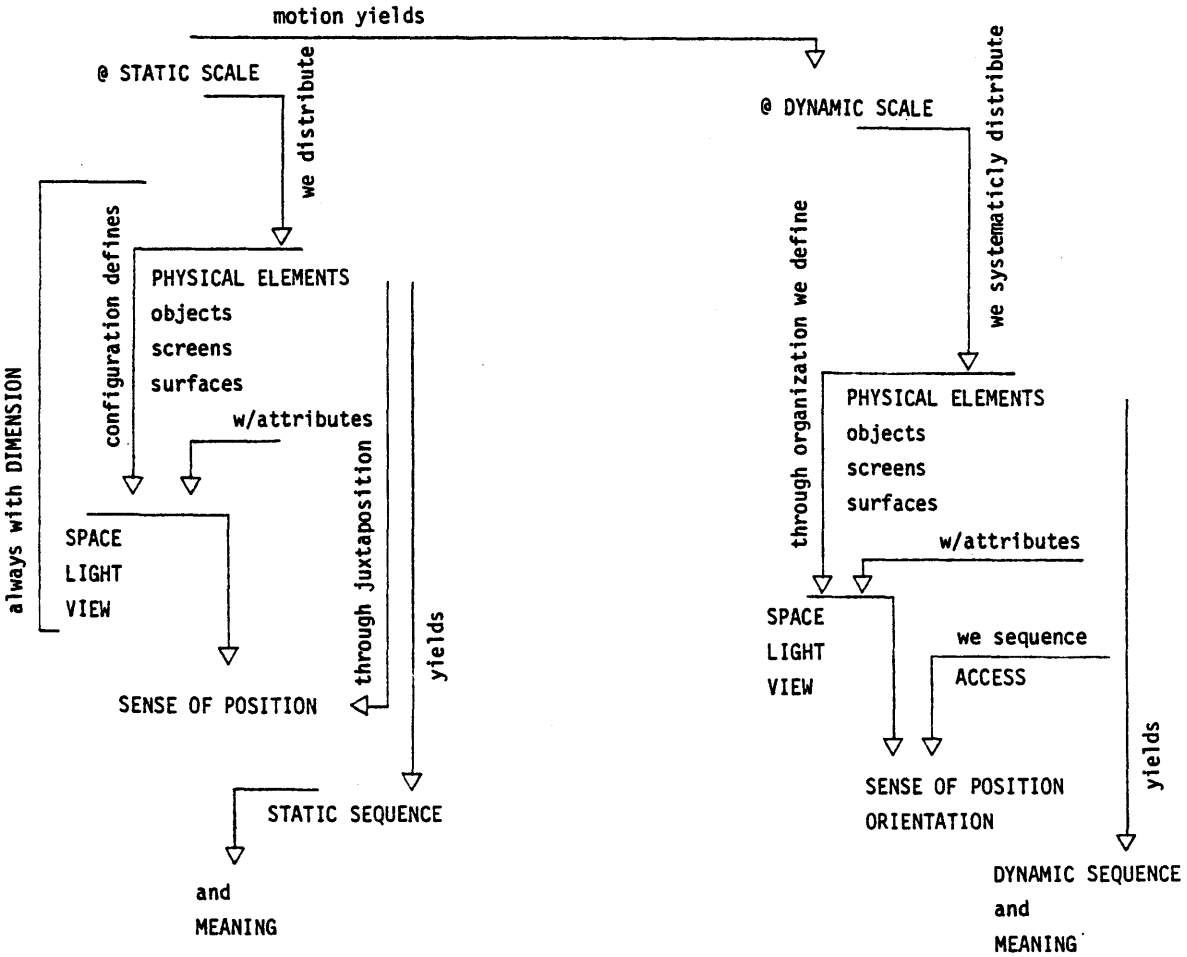


Sense of position has been discussed earlier. We must consider it an element because of its' profound effect at the static and dynamic scales. Additionally, it may be sequenced. It differs from previously mentioned elements in that we can not draw it. In order to assess position, we must mentally move through a projected sequence to determine the effect upon it.

Scale, and its' relativity, directly affects our perception of all the elements we have identified. We must consider scale and dimension as an element. Strictly speaking, dimension is not an element in itself. We can not speak of dimension only, nor of the dimension of dimension, except in a philosophical sense. We can however speak of the dimension of an element- the dimension of space for instance- or the dimension of a surface. In this sense we can sequence dimension. Staticly for example, we can juxtapose large and small. Since dimension is a common aspect of all the elements, and in this sense it can be sequenced, we must regard it as a special phenomenon of all the elements. Additionally, it is important to realize that in a dynamic sequence, dimension and duration are synonomous. At the dynamic scale then, duration is a special phenomenon of all the elements.


motion yields
@ STATIC SCALE
we distribute
@ DYNAMIC SCALE
we systematicly distribute
configuration defines
always with DIMENSION
PHYSICAL ELEMENTS
objects
screens
surfaces
w/attributes
SPACE
LIGHT
VIEW
through juxtaposition
yields
SENSE OF POSITION
STATIC SEQUENCE
and
MEANING
through organization we define
PHYSICAL ELEMENTS
objects
screens
surfaces
w/attributes
SPACE
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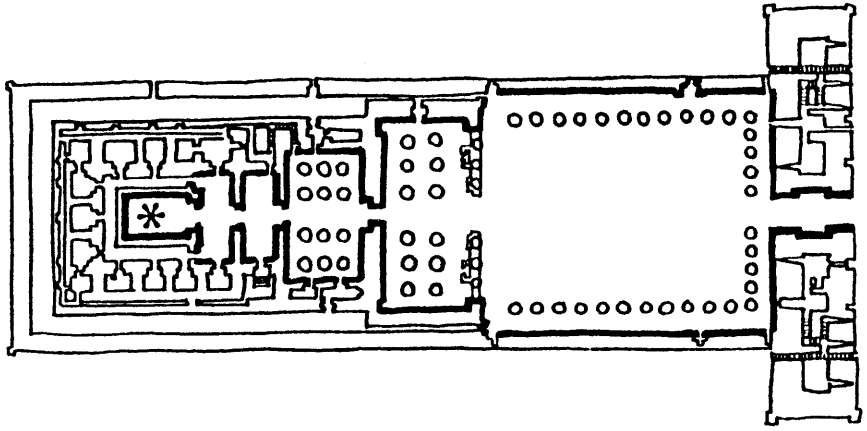
VIEW
we sequence
ACCESS
SENSE OF POSITION
ORIENTATION
yields
DYNAMIC SEQUENCE
and
MEANING

ATTRIBUTES OF SPACE



21.

Strictly speaking, architectural space does not exist without physical elements to define it. Nevertheless, it can be discussed and drawn directly without reference to these elements. Indeed, if we do not consider the space, we can not rationally distribute the physical elements that make the space. For these reasons space has special significance.

An individual space has visual attributes in relation to the architectural field in which it exists. Thiel alludes to:

- position
- size
- direction
- quantity
- shape

Space also has intrinsic attributes arising from its configuration. These include:

- containment
- proportion
- character
- shape

Containment refers to the degree of enclosure which the configuration of the space provides. Within the continuous range we can isolate:

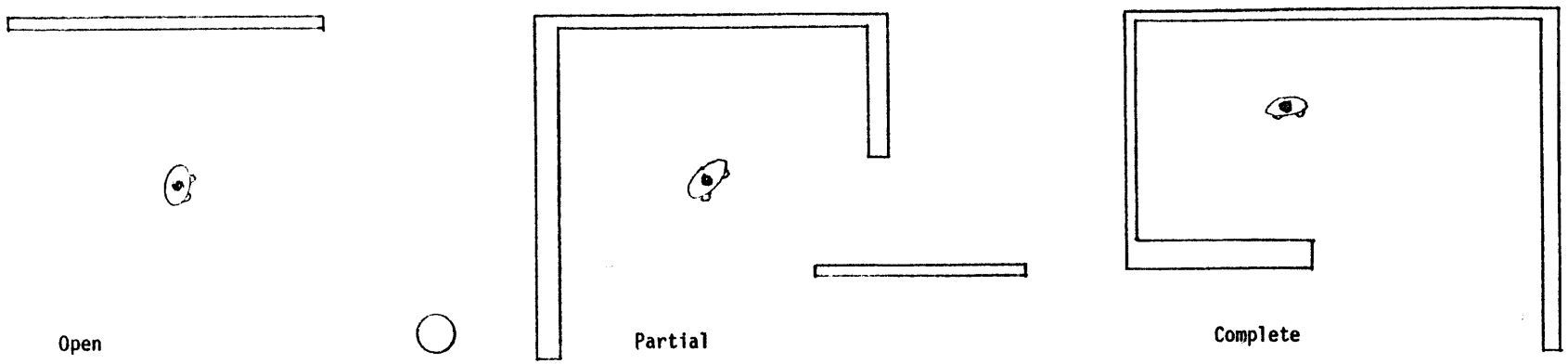
open
partial
complete

Open space, in the extreme condition, possesses indefinite form and little or no sense of enclosure. A boulder-strewn desert is a good example.

Partial containments, as the term implies, provide a sense of containment; however, their formal definition is not complete. Typically, they provide the feeling of containment and at the same time a strong association with some other space or spaces.

Complete containments possess the strongest sense of enclosure. In extreme examples they tend to be disassociative, particularly at the static scale. Through the use of view and light, we can design less extreme configurations that are associative and retain a strong sense of enclosure.

In a dynamic sequence, we can juxtapose and separate partial and complete containments, thus producing strong contrasts of position.



Proportion is an attribute of space which depends on the relationship of its width and height or its width and length. Based on this, we can make two broad classifications of space:

directional space
undirected space

Directional space typically has one dimension that is significantly greater than the other. This type of space generally induces motion and implies a focus at one or both ends. Undirected space is usually of near-equal dimensions: height and width or width and length do not differ greatly. The proportions of this type of space typically induce one to stop or meander. When the dimensions are identical or nearly identical, it is formally self-stable.

Character is an attribute of space which describes its focus, either inward or outward. In "The New Landscape in Art and Science", Gyorgy Kepes describes this quality:

> "Wherever we look, we find configurations that are either to be understood as patterns of order, of closure, or a tendency toward a center, cohesion and balance, or as patterns of mobility, freedom, change or opening."

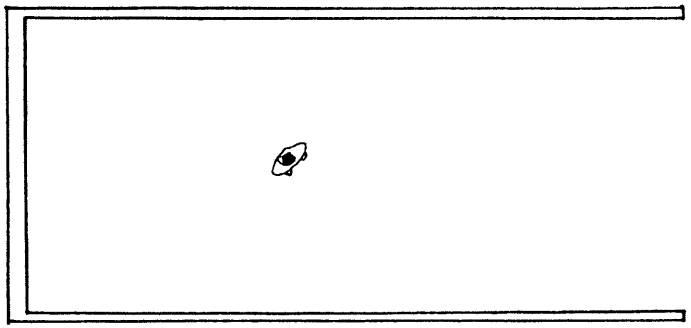
We can term these opposing qualities:

centroidal
eccentric

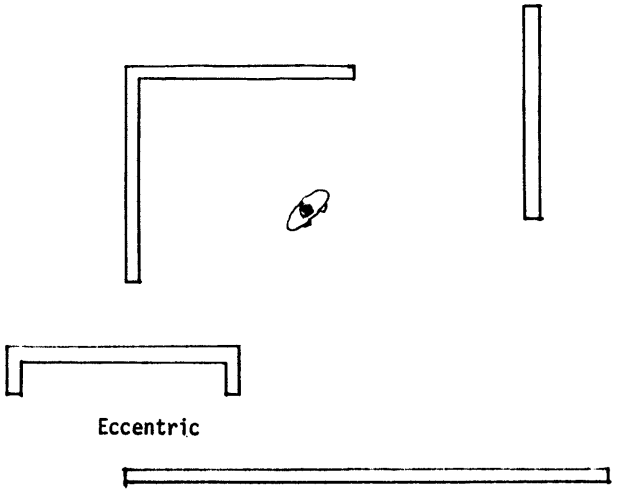
Centroidal space is introverted, balanced, calm or focussed within.

Eccentric space is extroverted, dynamic, with its center outside of itself.

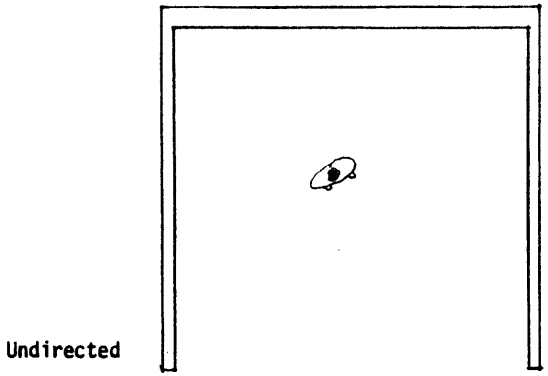
Shape, as we shall use the term, applies to the particular form of a space. Additionally it refers to whether the space is orthogonal curvilinear, or any of an infinite number of other forms or combination of forms. For our pusposes, we need not isolate types. However, we should note that shape may be juxtaposed and sequenced.



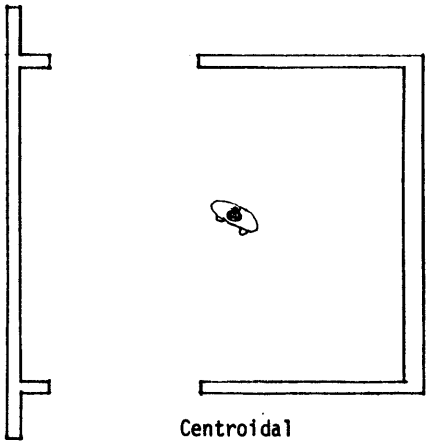
Directional



Eccentric



Undirected

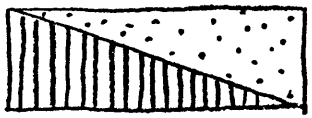


Centroidal

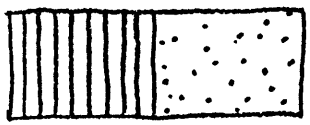
In 'The View From the Road' John Myer identifies six types of transition. By editing and regrouping these, we gain a conceptual tool for sequencing relationships and exchanges of elements in design. It is important to note that since we are again dealing with juxtapositions and separations, we are here refering to the act of designing or making relationships, and not directly to the perceptual experience of these relationships.

The following diagrames, borrowed from Myer, indicate in abstract form, the types of relationships and exchanges we may affect among any two elements.

Juxtapositions

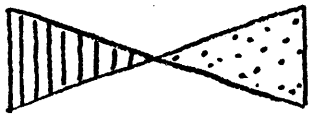


The exchange may be gradual



The exchange may be abrupt

Separations



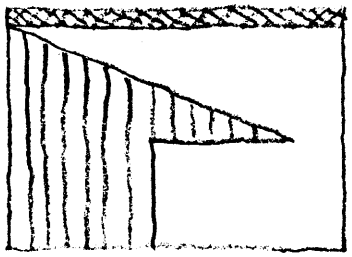
They may be separated by distance, large or small

They may be separated by a connection

RECIPROCITY AND TRANSITION

In designing an architectural field we must deal with more than two elements at a time. In fact, at any point in a sequence we will most often be involved with all of the elements. Additionally, all the elements will not have identical relationships at any one point. For instance, if we apply the concept illustrated in diagrame 'C' to the element 'light', we may expect that if light is separated, the physical elements and space may be continuous. At another point in the sequence, we most probebly will find a differant set of relationships.

In 'Fragments of Theory', Maurice Smith identifies this reciprocal relationship of the sequence elements. Reciprocity, as a concept recognizes the fact that when one or more elements change their relationship the others may not. Additionally, among elements which change relationship, the type of relationship change need not be the same.



While one element continues unchanged
another element is abruptly juxtaposed
while a third element makes a gradual change.

TOOLS

Fortunately there exists a large variety of tools that we may employ in the process of designing buildings. Some are more applicable than others in achieving our stated goal of fashioning three dimensional non-linear fields determined by linear sequential experience. However, our best approach it to use a variety of tools rather than just one. Ultimately we must visualize the product. The tools, for the most part, serve as programming devices for the minds' eye. There are five identifiable groups of tools:

views
motion depictions
orthographic projections
three-dimensional representations
scores

VIEWS

Views include photographs and perspective drawings. Photographs help us little unless they are used in conjunction with models. Perspective drawings, however, may be used at any point in the design process. As Thiel points out, their disadvantage is that they are discontinuous and reveal what the field looks like from only one point of view. However, as has already been stated, we need not be concerned with the calculus of time. Hence, with judicious application

K 3

K 19

K 31

22.

we may let a perspective depict a segment of sequential experience and visually inhabit that segment. It is important to realize, however, that no matter how many perspectives we employ, we can never completely describe a building through their use exclusively. Their value is as a testing device used in conjunction with other tools.

MOTION DEPICTIONS

Motion depictions include film and perspective sketches done in series. Film is of little direct use in conceptualizing. A series of perspective sketches may be helpful if we wish to visualize a continuous motion. However, as is pointed out in the discussion of segmental experience, this is not necessarily synonomous with our perception of motion through an architectural field.

THREE-DIMENSIONAL REPRESENTATIONS

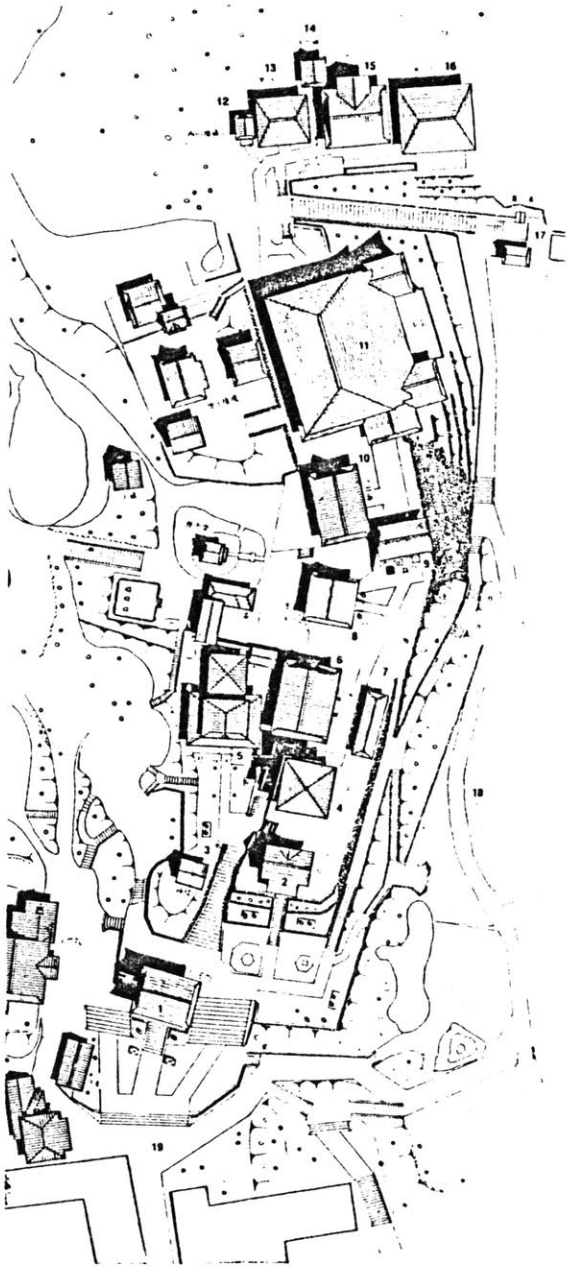
Three-dimensional representations include models and axonometric drawings. These tools have the characteristics of orthographic projections with the obvious advantage of being three-dimensional.

ORTHGRAPHIC PROJECTIONS

Orthographic projections include plans, sections, and elevations. These are depictions from an infinitely distant viewpoint and are, in some respects, discontinuous. The plan and section, which are cut views, are abstractions in the sense that they can never be seen in reality. These characteristics are in some instances a disadvantage and in others an advantage.

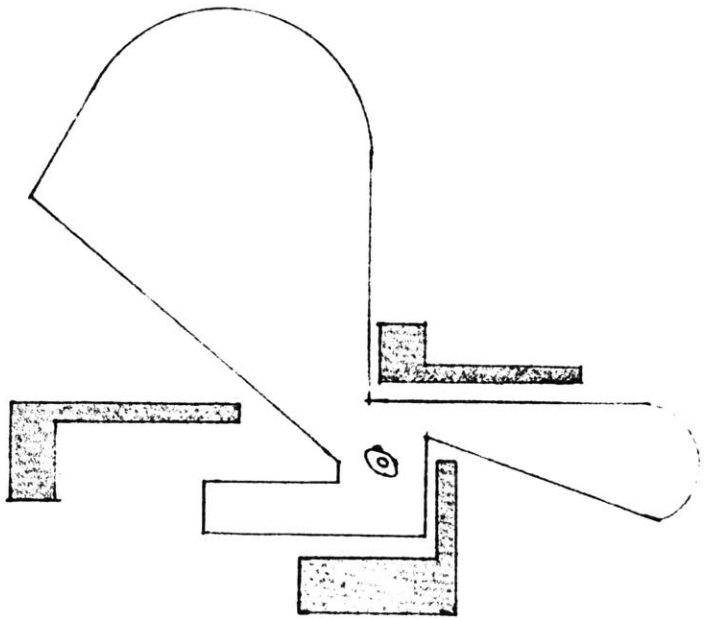
With the exception of three-dimensional representations, these drawings enable us to reveal more information in a glance than any other type. Additionally, the information may be either linear or non-linear, as we choose. Orthographic projections and three dimensional representations are the only tools which can, on their own, describe an architectural field. In this sense they are similar to the musicians' score which directly represents a musical performance.

If we train ourselves to see it as a sequence diagram, the plan can be particularly valuable in conceptualizing non-linear organizations of linear sequential experience. The main reason for the plans' uniqueness in this regard is the fact that the horizontal plane



23.

is the one that we use and move on. In the plan we may indicate vertical transitions and the horizontal level above or below the one under examination. In this way we may visualize large chunks of sequential experience, particularly when we incorporate sections and other tools.

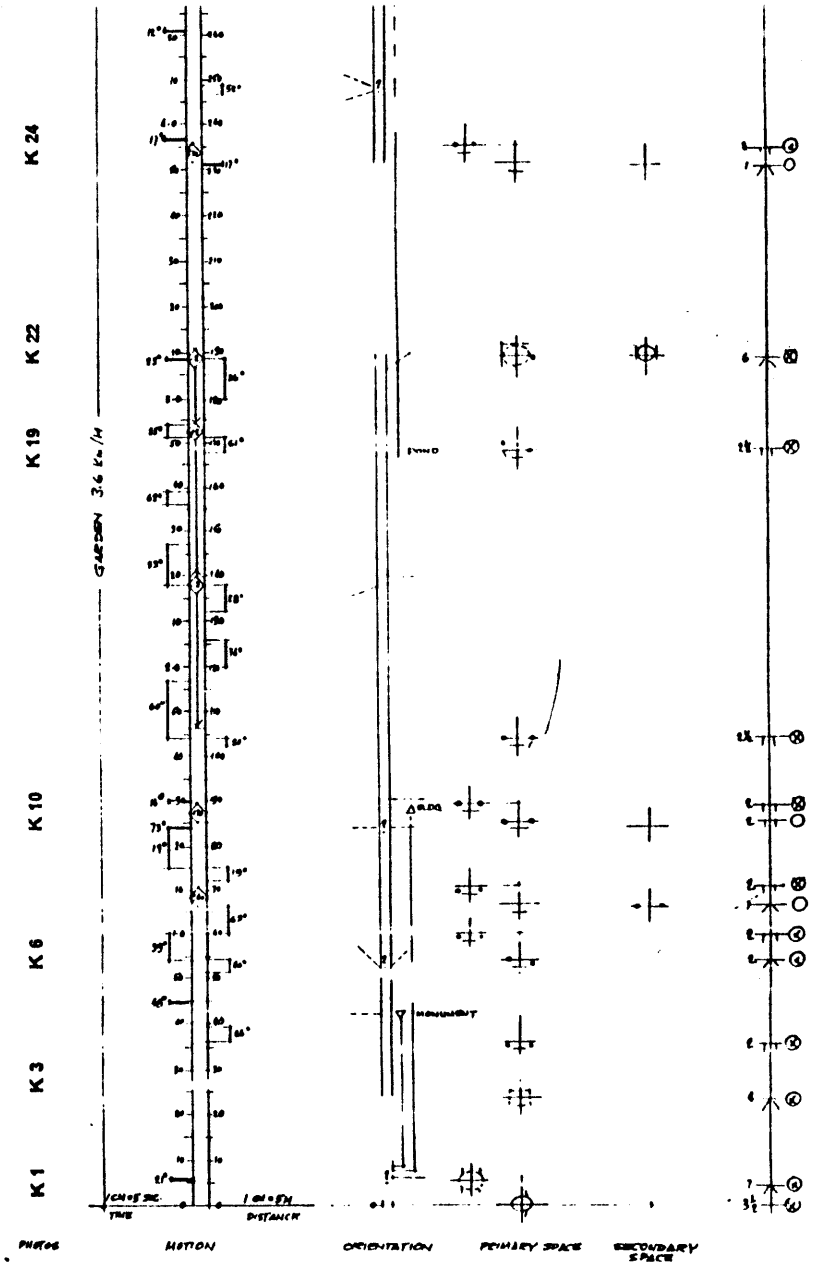


Isovist diagram

Orthographic projections may be direct depictions of building elements in which space, view and light are directly implied. They may also be drawn as direct abstractions of space, light or view alone. We are all familiar with diagrams of space and light. Philip Thiel suggests the Isovist, conceived by Tandy (1967), as a method for diagramming view.

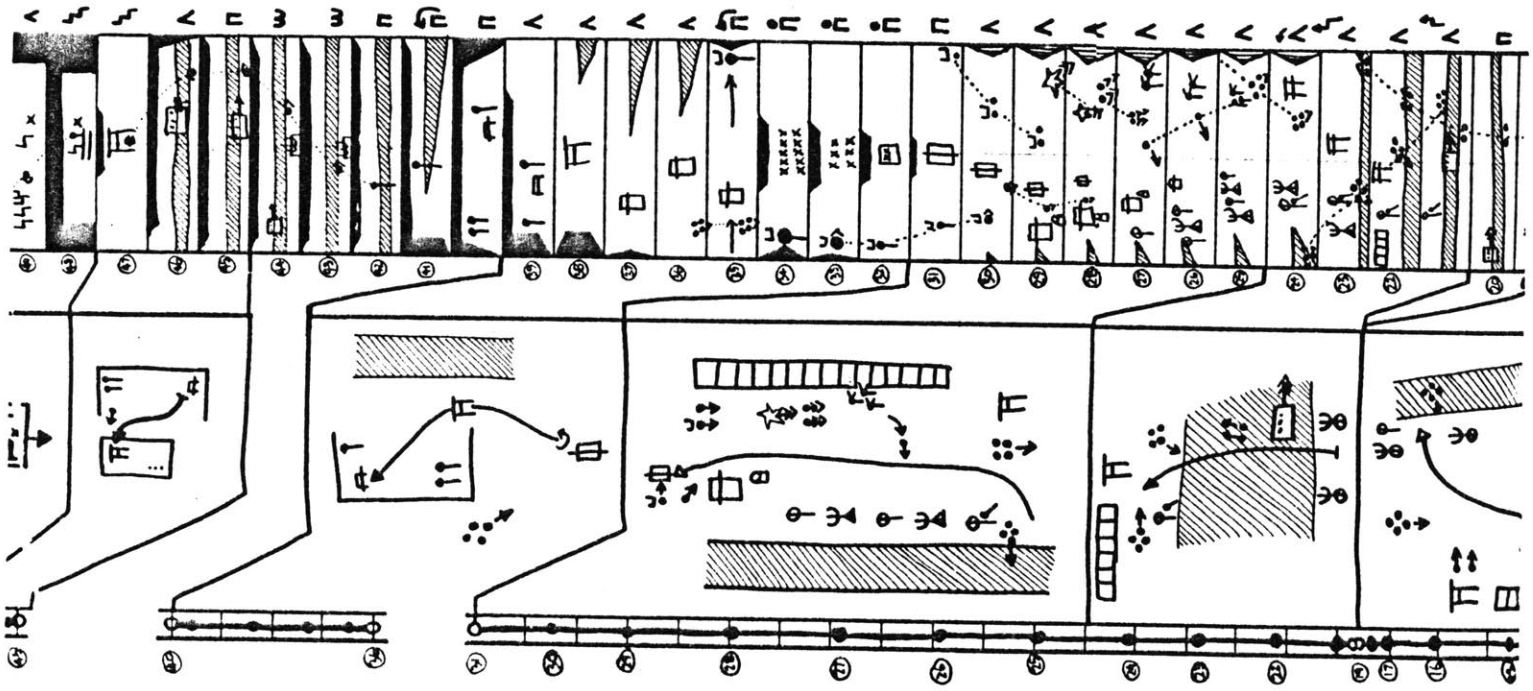
SCORES

Scores are a method of diagramming sequential experience. The term no doubt comes from their resemblance to musical scores in their abstract appearance. In that they directly represent sequential experience, they are similar to musical scores. However, they differ greatly in that they do not fully describe what we want to make, the three-dimensional field. In "A Sequence-Experience Notation" Philip Thiel



24.

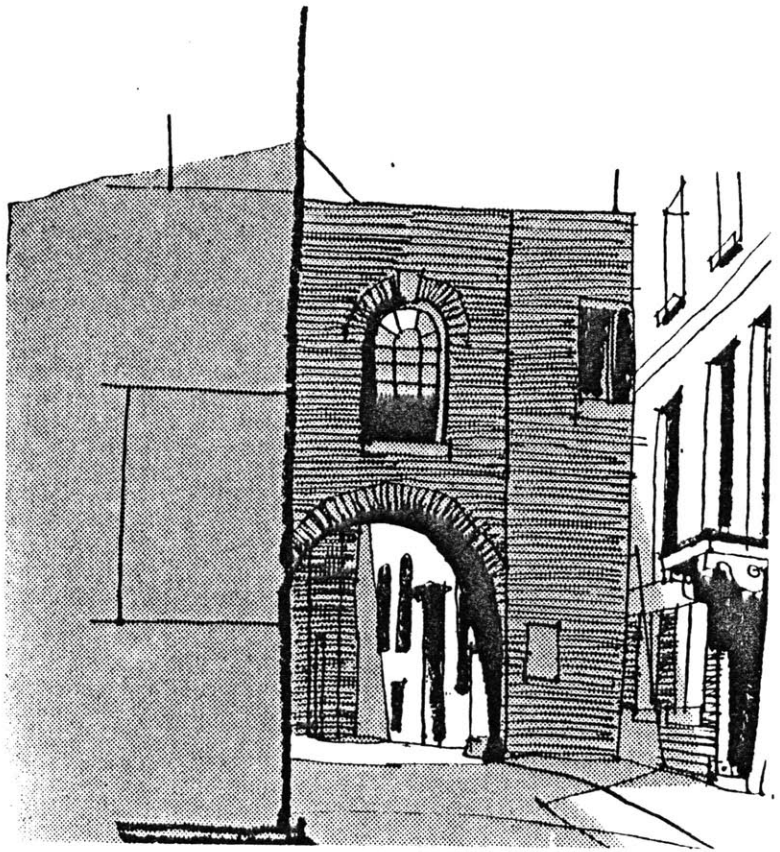
describes in detail a scoring method for recording architectural experience. It is a valuable tool for recording and programming sequential experience.



25.

DYNAMIC TRANSITION AND SPATIAL EXCHANGE

An architectural field is not typically composed of only one space. It usually consists of a group or series of spaces. Thus how we make the exchange from one space to another is of great concern. At the dynamic scale we are interested in spatial exchanges one can move through. Hence, in this section we will not consider an exchange which only involves view or light. A little thought will reveal that of the sequence elements we have identified, space, view and the physical elements are the most important in application to spatial exchange. Dimension of course is tacitly involved whenever we mention any sequence element. Since we are concerned with spatial exchange as it applies to sequential experience, we want to know in relative terms, how much time is involved in the exchange. In other words, we are concerned with whether the transition is abrupt or gradual. Additionally, we must determine if it is directly or indirectly accomplished.

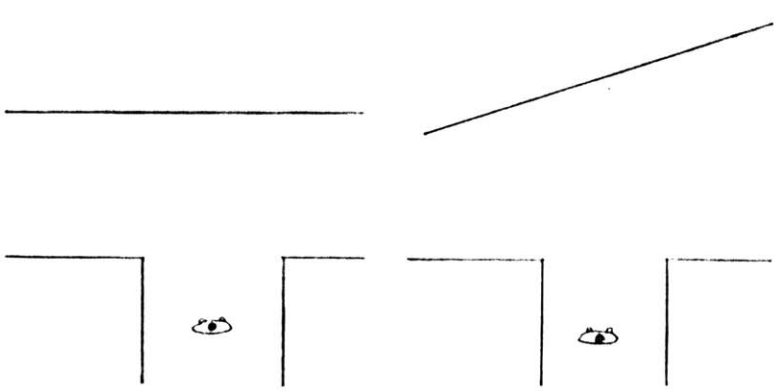


26.

View is the parameter through which we determine whether a spatial exchange is direct or indirect. We can represent degree of directness with four classifications of view;

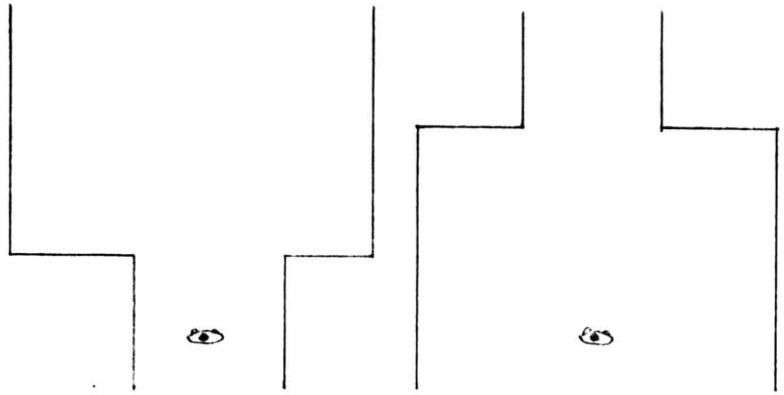
closed
deflected
open
through

With regard to view, it should be noted that in the diagrams of the spatial exchanges which follow, the category names hold true only for the direction of view depicted, and only if the height of the physical containment diagramed is sufficient to block or otherwise control the indicated view.



closed

deflected



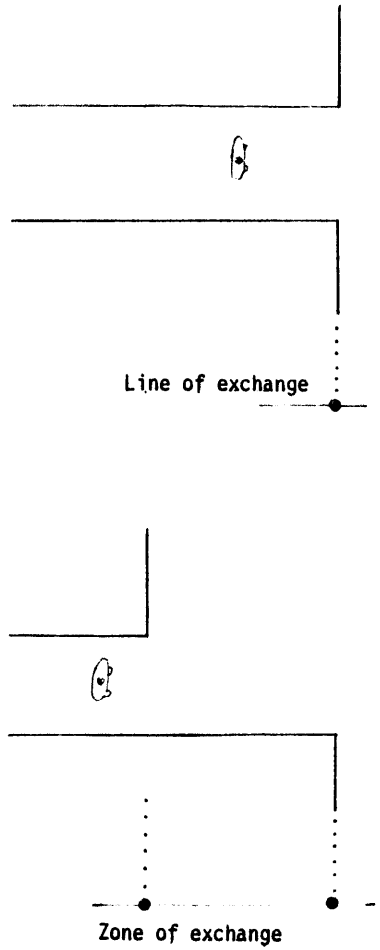
Open

Through

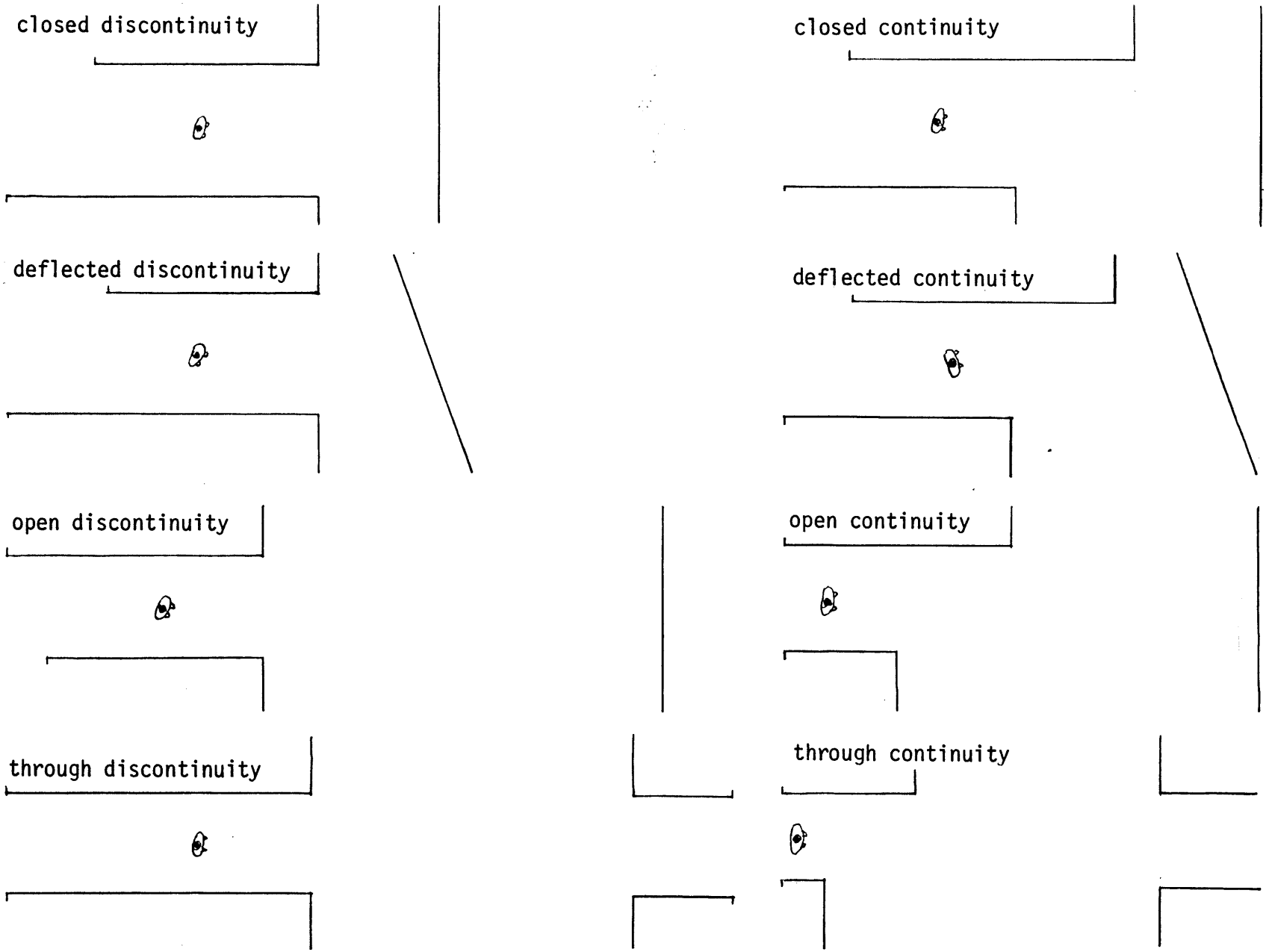
In designing physical and spatial configurations of exchange we provide abrupt transitions by making them discontinuous, and gradual transitions by making them continuous. As this applies to spatial configuration, we make spaces discontinuous and their exchange abrupt, when we provide sharp lines of demarkation, either directly or implicitly, between them. We make spaces continuous and their exchange gradual, when we provide a zone of demarkation by means of a surface displacement. It is important to realize that in this sense, spatial configuration and physical definition are nearly synonomous. When one is continuous so is the other, when one is discontinuous they are both discontinuous. Thus, within any exchange, space and the physical element defining it are:

continuous

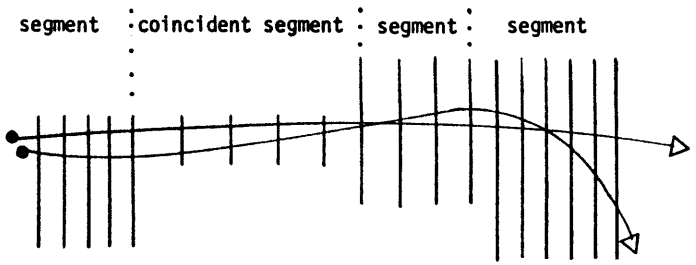
discontinuous

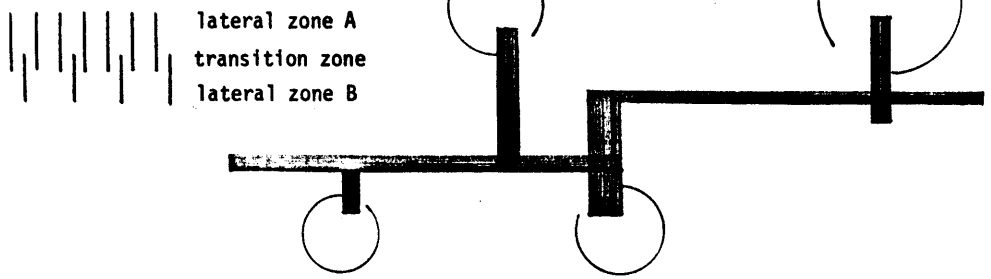


In the category names which accompany the exchange diagrams, the first word applies to view, the second to space or physical definition.


closed discontinuity
deflected discontinuity
open discontinuity
through discontinuity
closed continuity
deflected continuity
open continuity
through continuity

ASSUMPTIONS FOR DESIGN



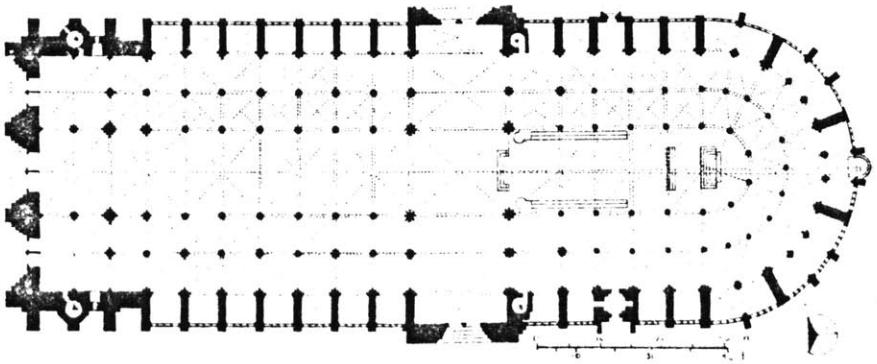


As previously stated, the access is a zone of varying width. When it is wide we can not predict the exact line of motion an observer will choose. If desirable, we may encourage one particular line of motion over another through the use of perceptual clues. However, in most instances this is unnecessary and often undesirable. We may isolate segments of a spatially continuous access and design them at the static scale. We may then relate one to another into a dynamic sequence. Alternately, with an access system consisting predominatly of movement, we may choose to look at a segment of this access as consisting of lateral zones, each with its' own unique perceptual experience. When it is desirable for the access to be coincident with a specific perception; a specific view for instance, we may make the access narrow or encourage a particular line of motion over others. In designing three dimensional systems of sequential experience, we need not do so linearly. The observer is capable of proceeding along only one path at a time, and so his perceptual experience must be linear. However, the access system we offer him, need not be so. For instance, we may organize the access into one main sequence, with sub-sequences off of it. There are other organizational systems we may employ. Additionally, the experience going need not be the same as that of coming back, however they may reciprocate. The point is that the number of optional paths is nowhere close to infinite. All remains under our general control, if not absolute control. This is consistant with our previous definition of an architectural field. We are, afterall designing built fields, not symphonies or films.

SPATIAL SYSTEMS

Of all the sequence elements , space is the only one through which we physically move. In addition, we often use the term in a manner which takes into account the effects of the other elements and their attributes. For these reasons space has special significance. In design, to dynamically sequence experience we must assemble spaces within an experiential system. The range of systems is continuous and broad. However, by isolating the two extremes and the middle we gain a tool from which we can interpolate. We can thus identify:

singular associative
optionally associative
serial spatial

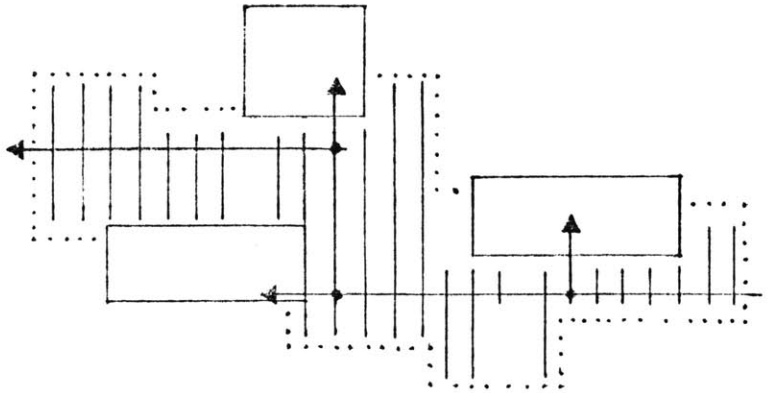


27.

SINGLE ASSOCIATIVE

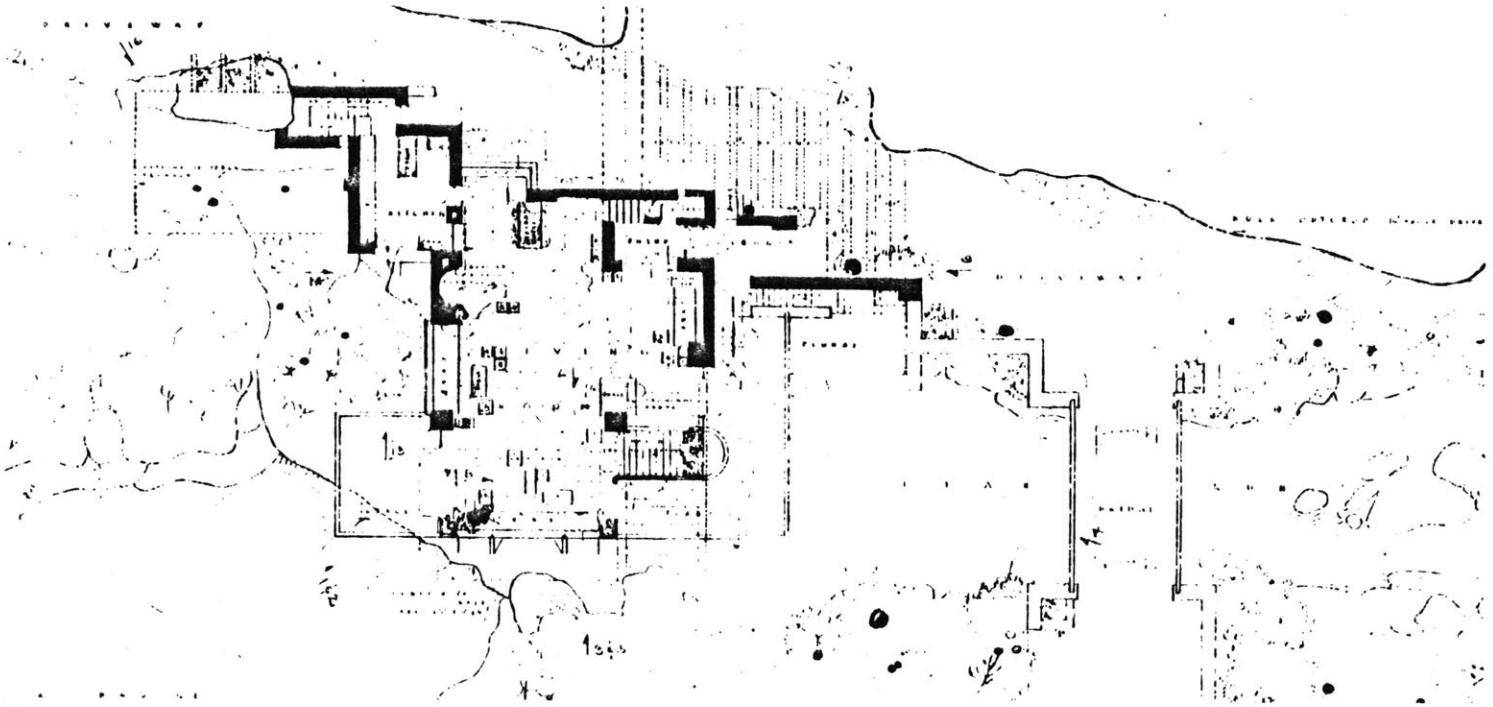
The single associative space is, in essence, an entire subuniverse. All the sequence elements are fully continuous. It may contain smaller and lower areas within itself. Yet wherever we go we are aware of the single contining space. It is a static sequence so large that it becomes a dynamic sequence as well.

28.



OPTIONAL ASSOCIATIVE

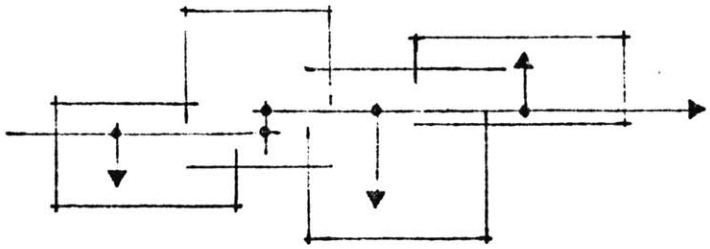
The optional associative system combines aspects of the single associative and the serial spatial systems. There is most often a sustained reciprocity between continuity and discontinuity of sequence elements. At times one or more elements may be discontinuous while the remaining elements maintain continuity. At some points within the dynamic sequence all sequence elements may be discontinuous, or all may be continuous.

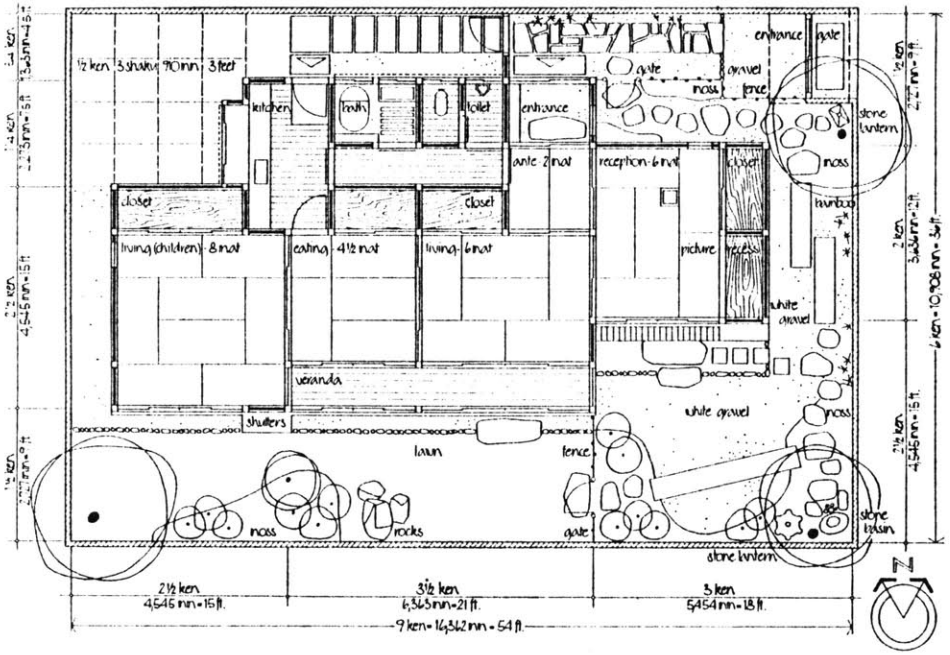


29.

SERIAL SPACE

In the serial spatial system, each space is experienced separately from the others. At any point, several sequence elements are discontinuous. While we are within any segment of the dynamic sequence, our perception is focused upon it.



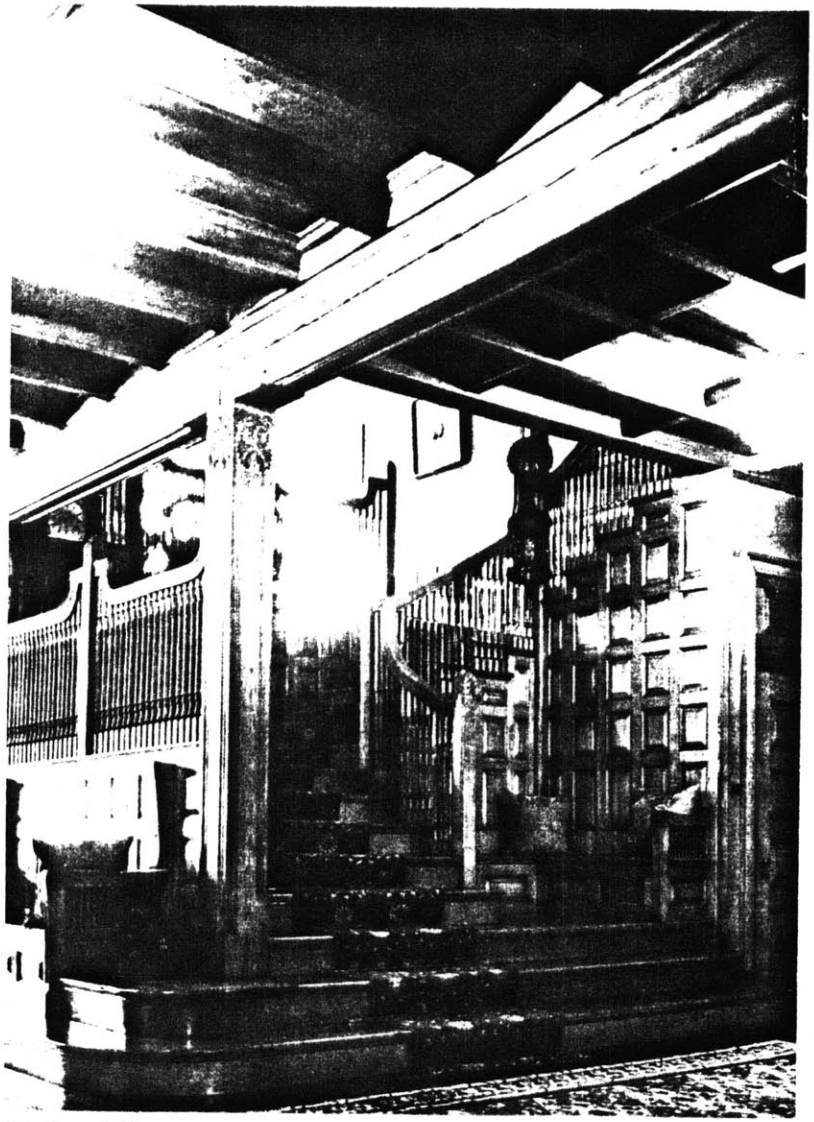


30.

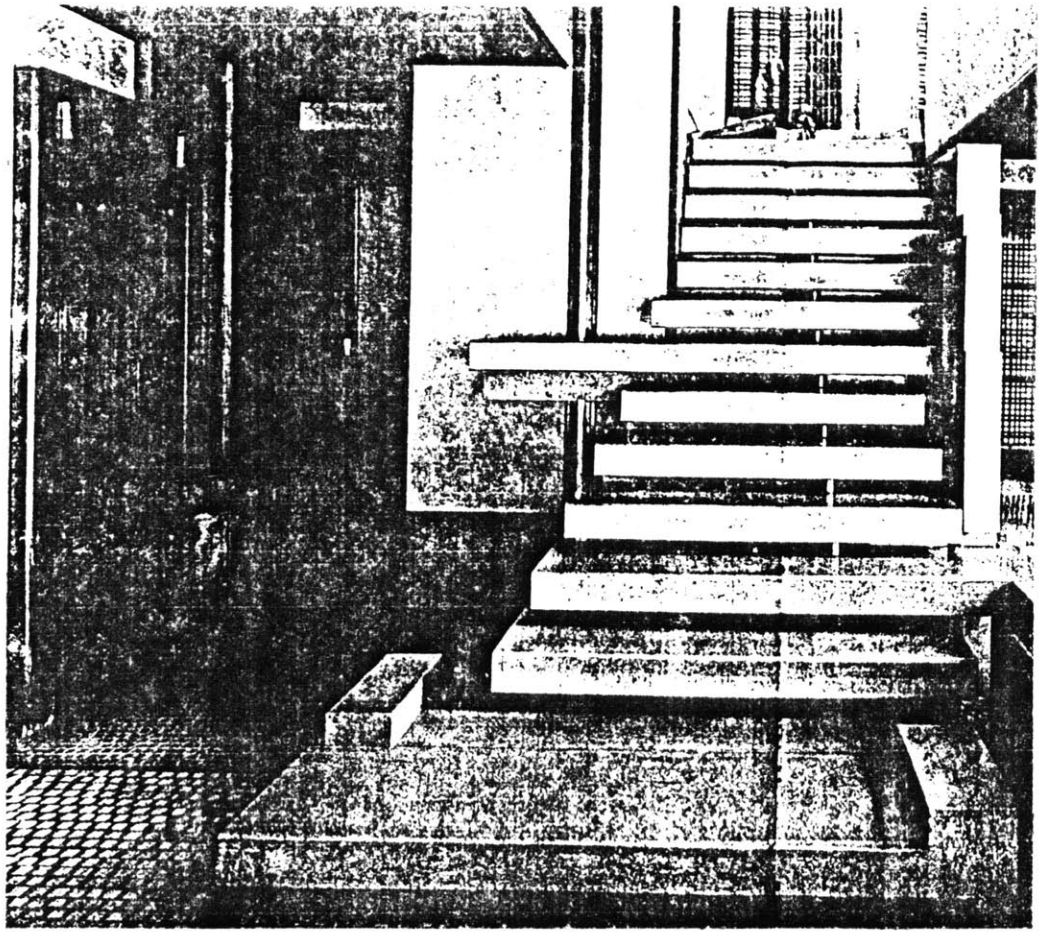
VERTICAL TRANSITION SYSTEMS

As physical beings bound by gravity, our use is limited to the horizontal plane. This fact makes the vertical transition from one floor to another of particular importance. Vertical transitions run the gamut of a continuous scale. However, as with spatial systems, we gain a valuable tool for sequencing experience if we define the two extremes and the middle. We may thus isolate these vertical transition systems:

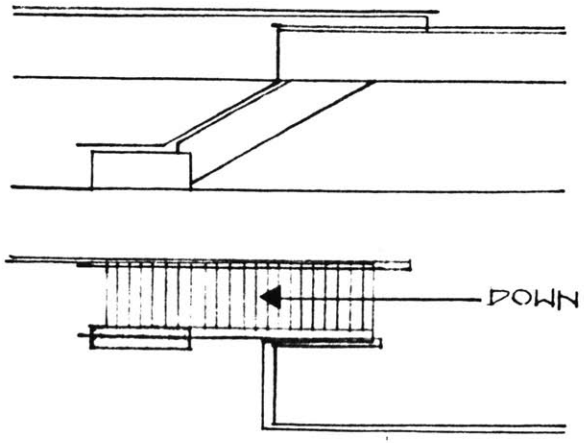
fully associative
partially associative
serial



31. Partially associative transition



32.

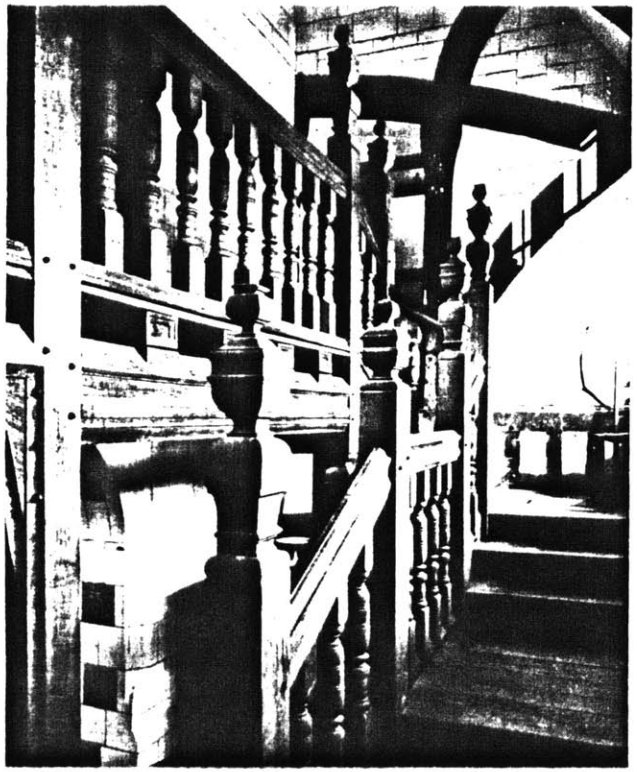


FULL ASSOCIATIVE

In a fully associative vertical transition the observer is constantly aware of the space he is leaving and where he is going. Space, view, light, and physical elements are all continuous. In this system it is important to note that the observer associates more fully with the lower level as he goes down than with the upper level as he goes up.

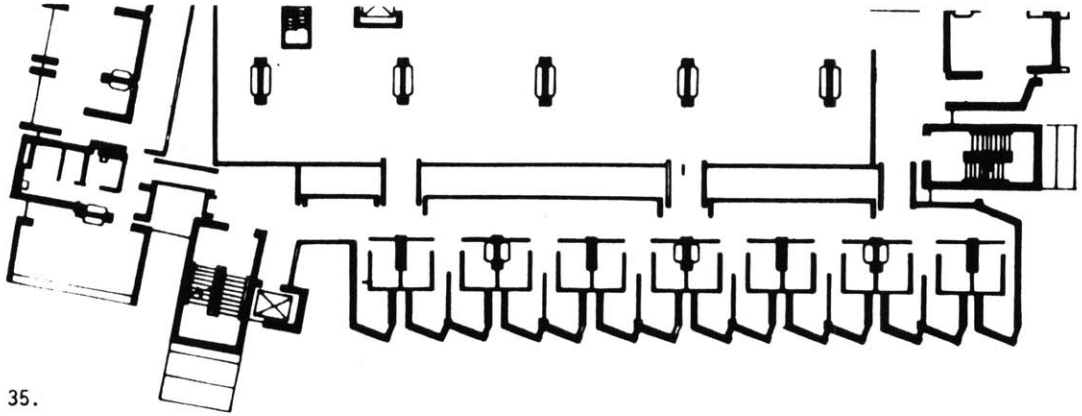
PARTIAL ASSOCIATIVE

A partially associative vertical transition combines aspects of the fully associative and serial transitions. It probably includes the widest variation. One or more elements are usually discontinuous; however, not all of them. For instance, a partially associative transition may possess visual continuity and spatial discontinuity. As a dynamic sequence, it offers more opportunity for variety and difference of experience than the other transitions. For example, a particular transition sequence might start out fully associative, all elements continuous; then become serial, all elements discontinuous; and end up fully associative again. As in a fully associative transition, the observer usually associates more fully with the lower level going down than with the upper level going up.



33.

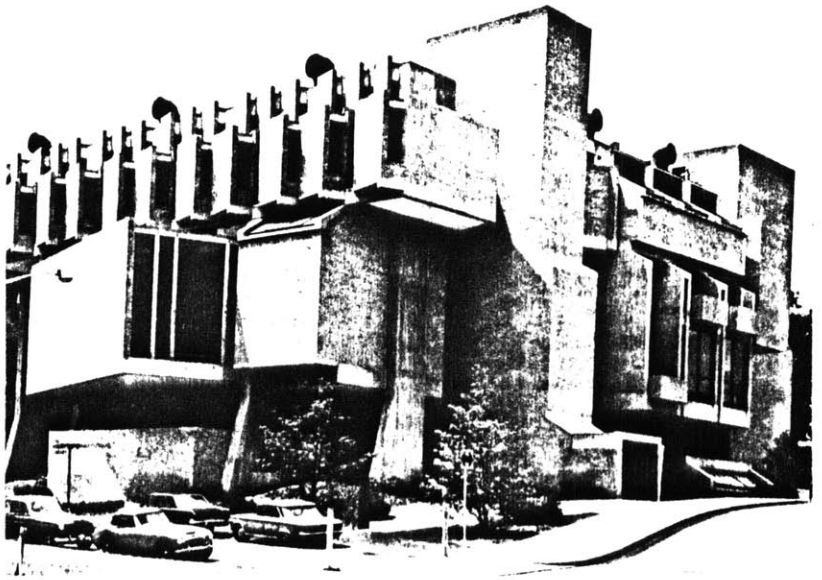
34.



35.

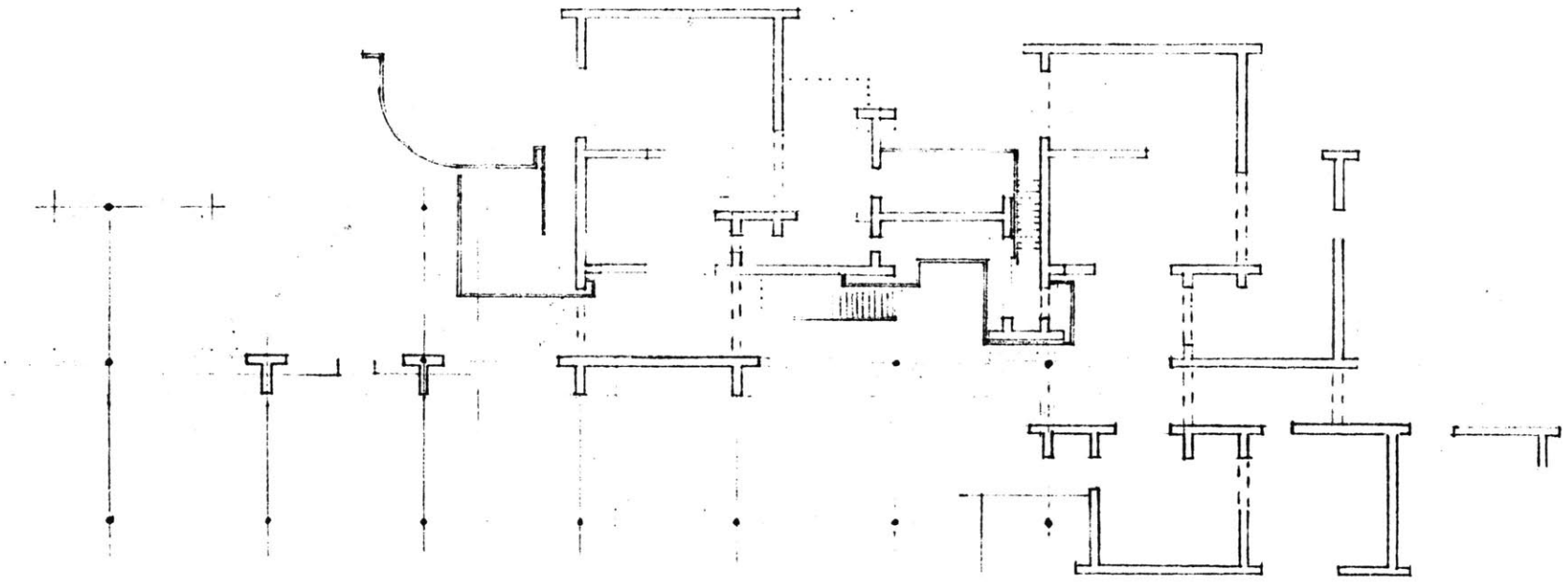
SERIAL TRANSITION

In a serial transition the observer enters and moves through a separate vertical transition space. Typically all the sequence elements are discontinuous. Hence, during the transition the observer is unaware of his destination and has lost direct association with where he has been. As part of a dynamic sequence, it can be more associative if placed within, or at the edge of a vertically associative space. Except for the obvious, within a serial transition the observers' experience going up is nearly the same as it is going down.



36.

ARCHITECTURAL FIELD



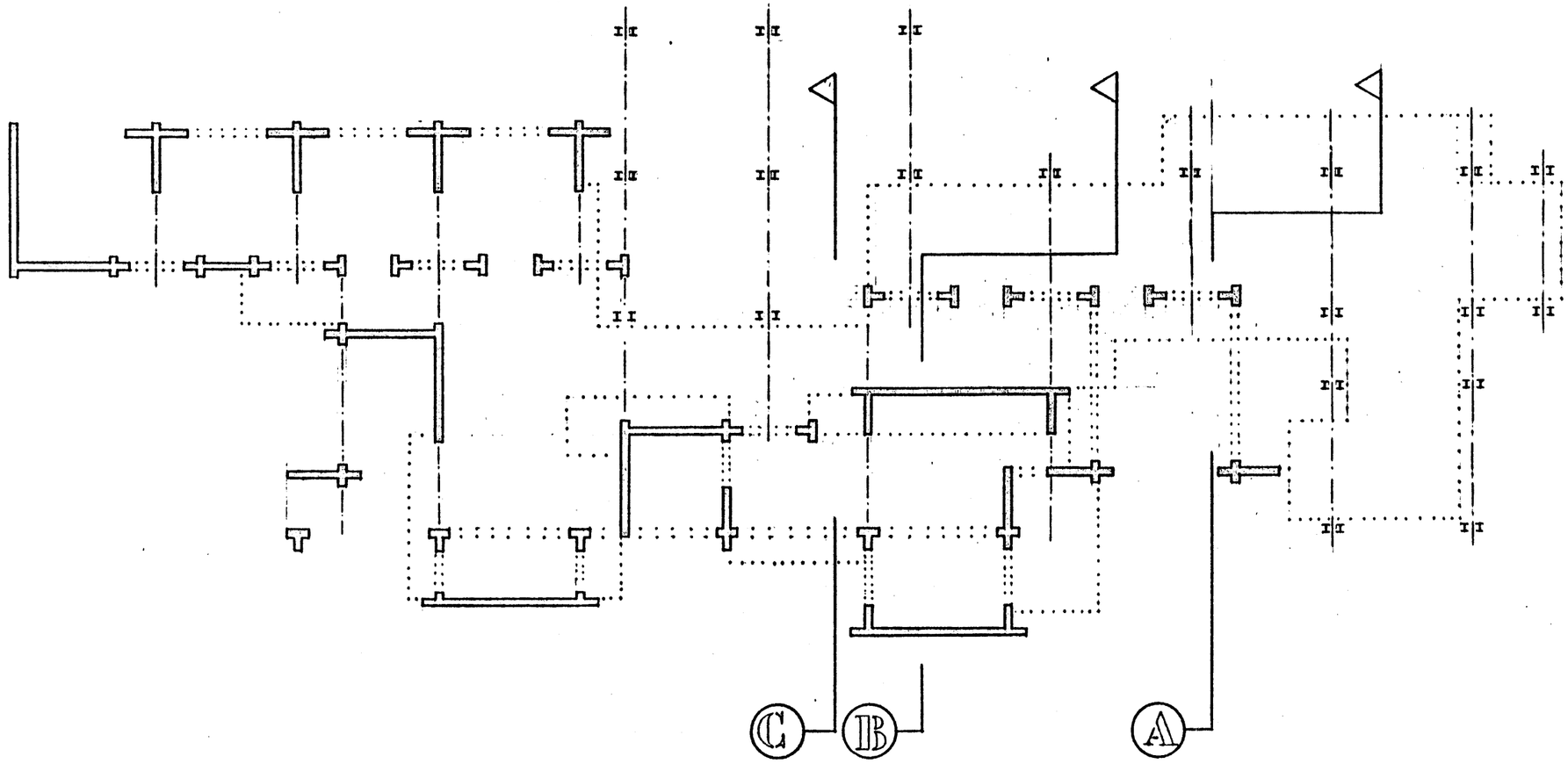
KEY TO PLATES

STRUCTURAL FIELD

FINAL SCHEME 0 5 10FT.

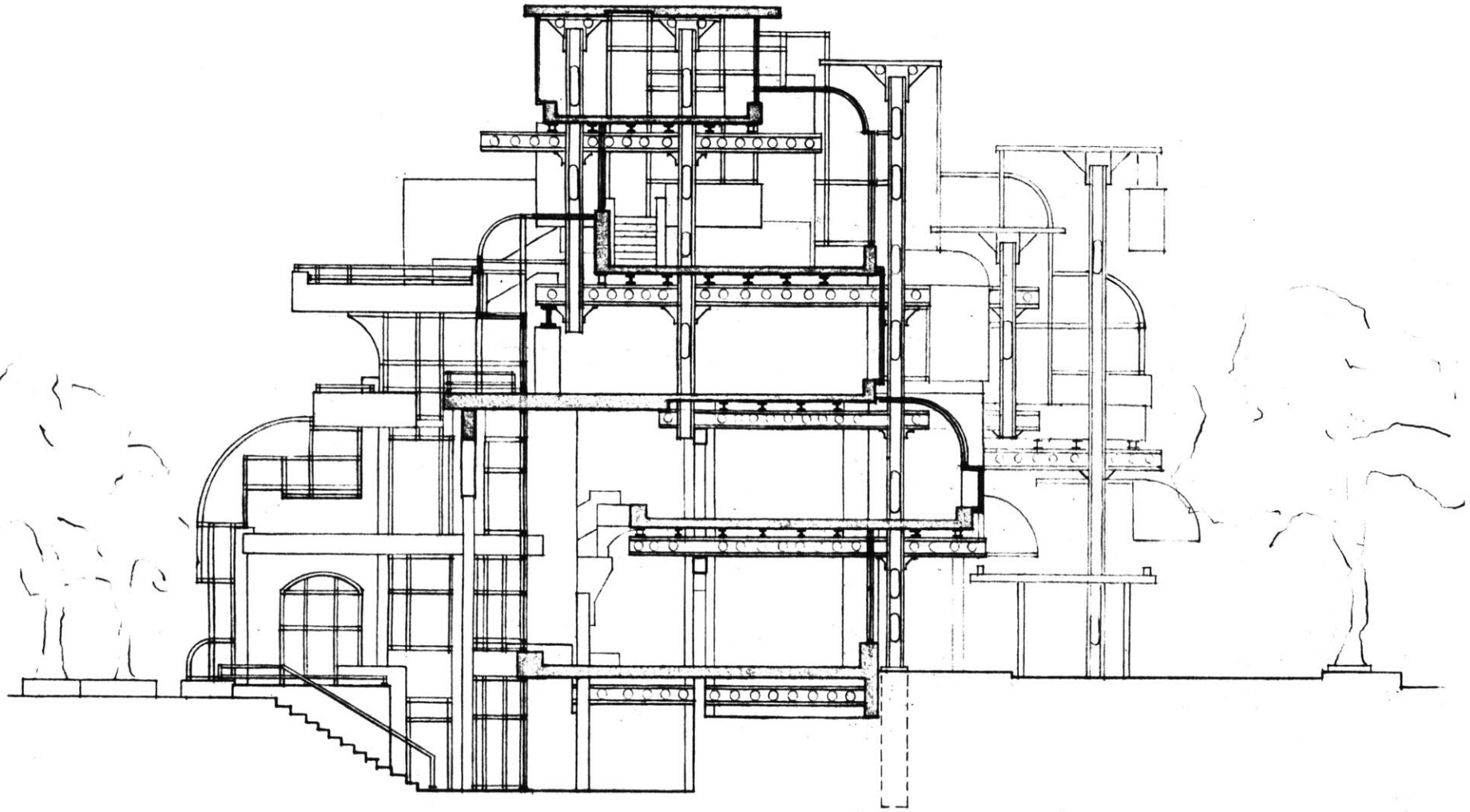
NORTH

KEY TO SECTIONS



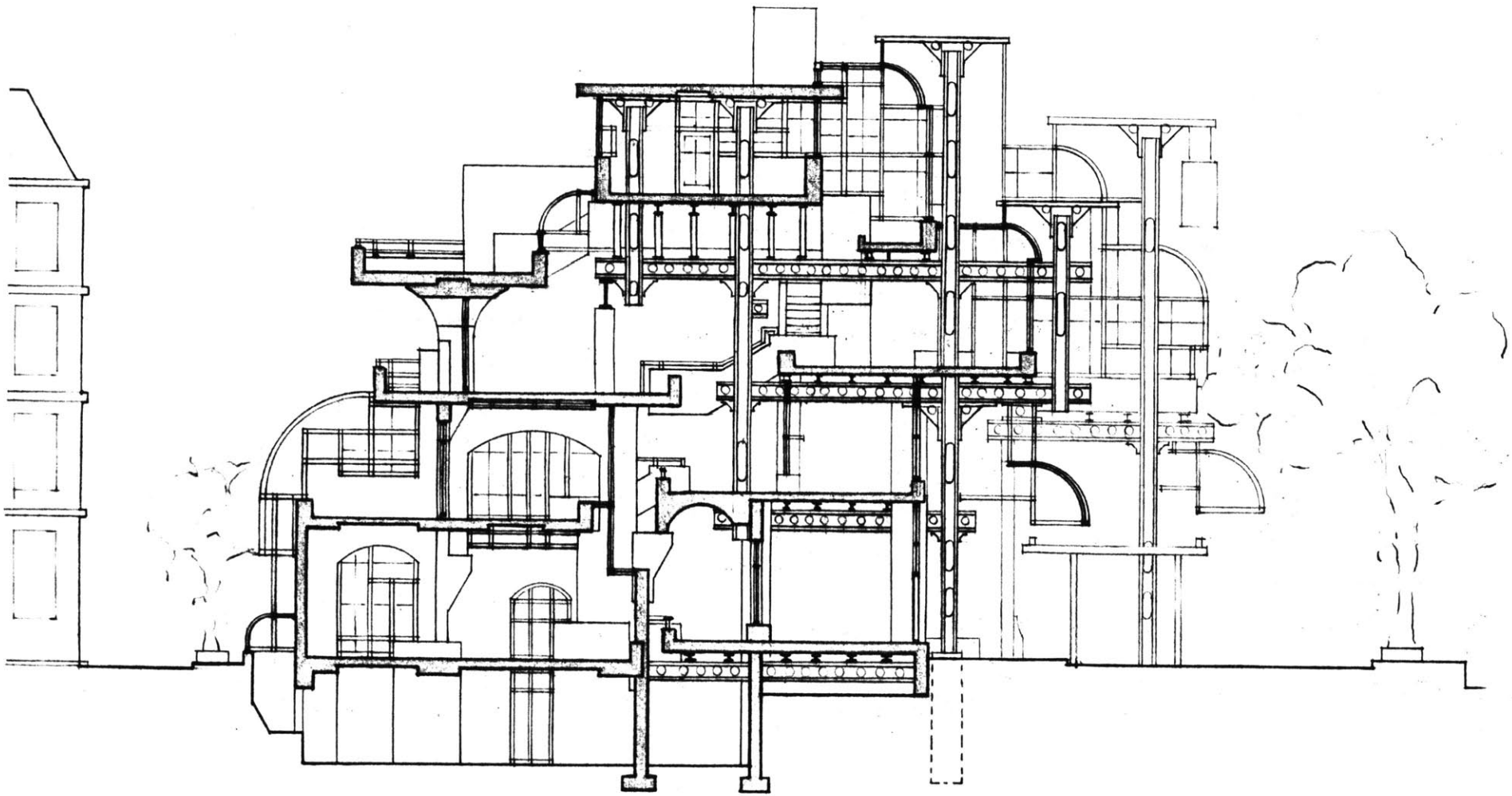
SECTION A

1/16" = 1'-0"



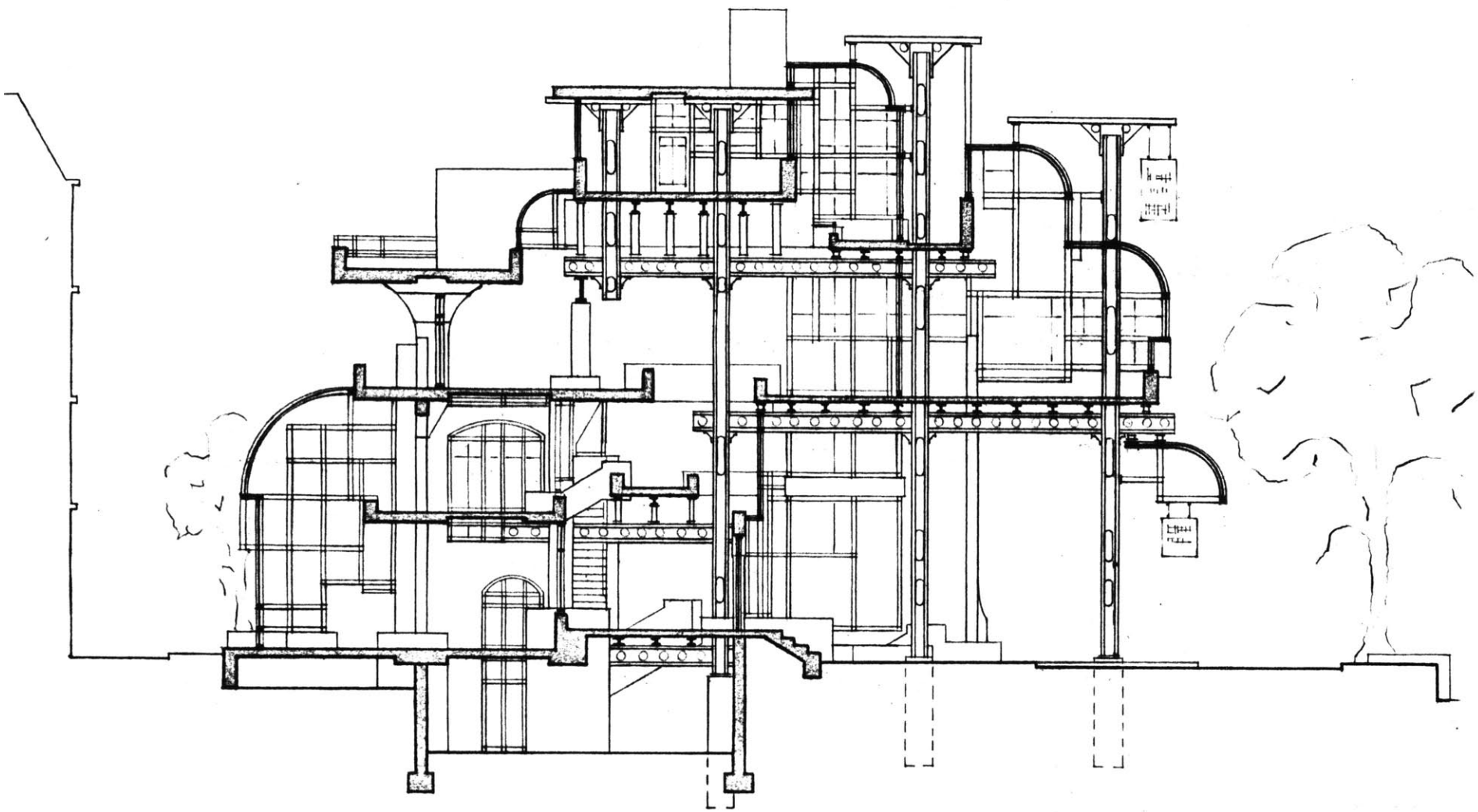
SECTION IIB

1/16" 1' 0" FINAL SCHEME



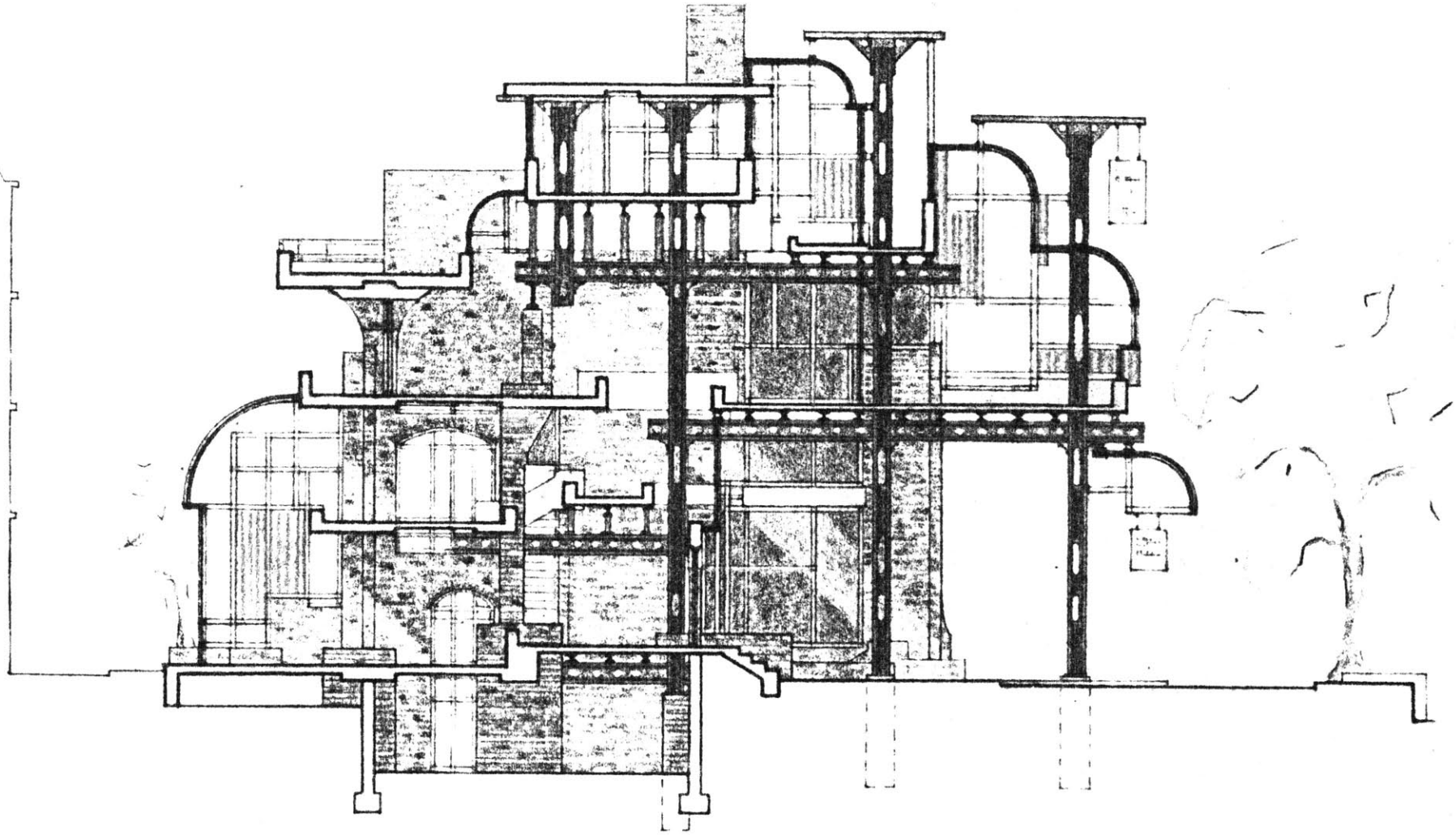
SECTION C

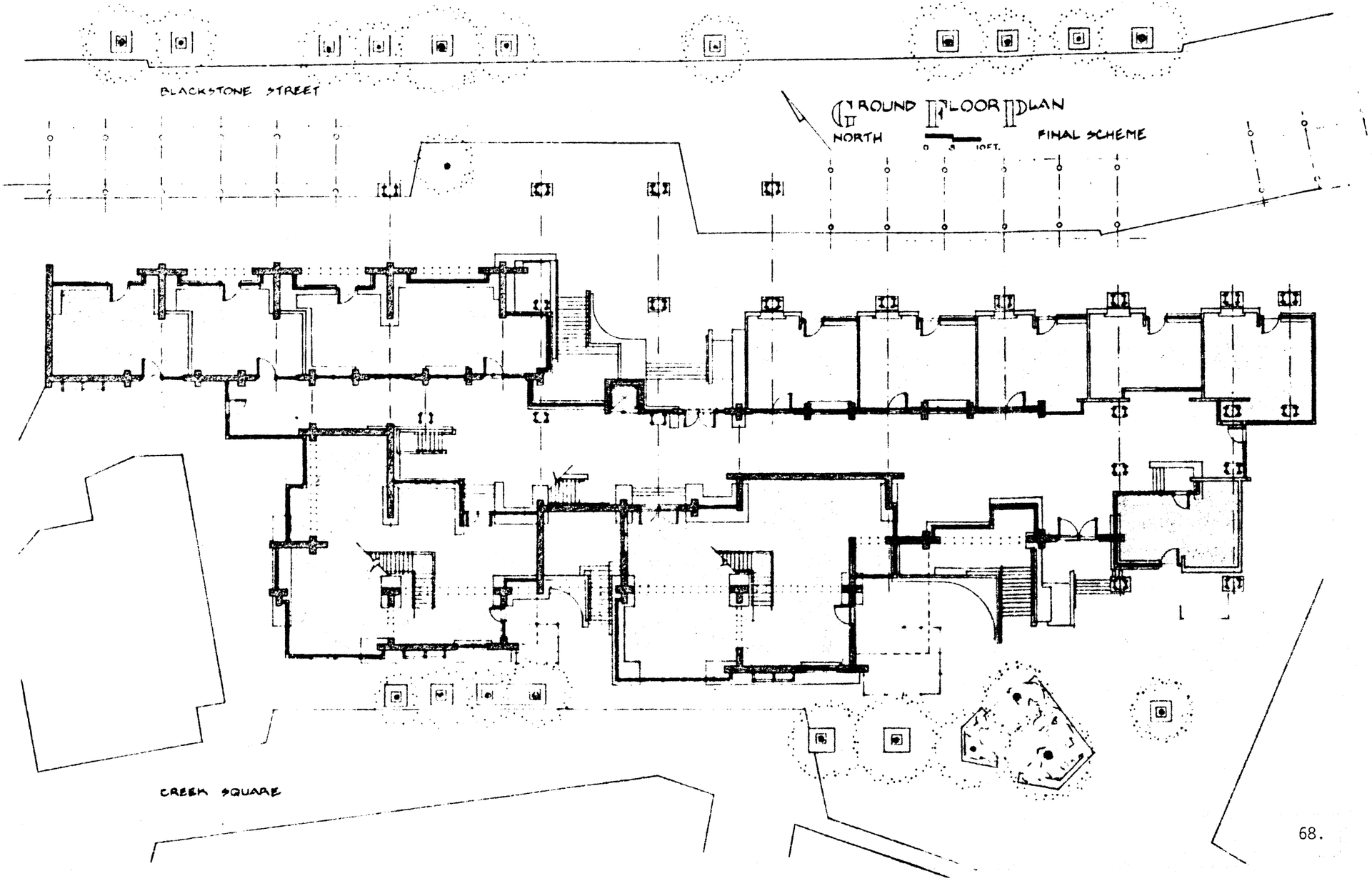
1/16"= 1'-0" FINAL SCHEME



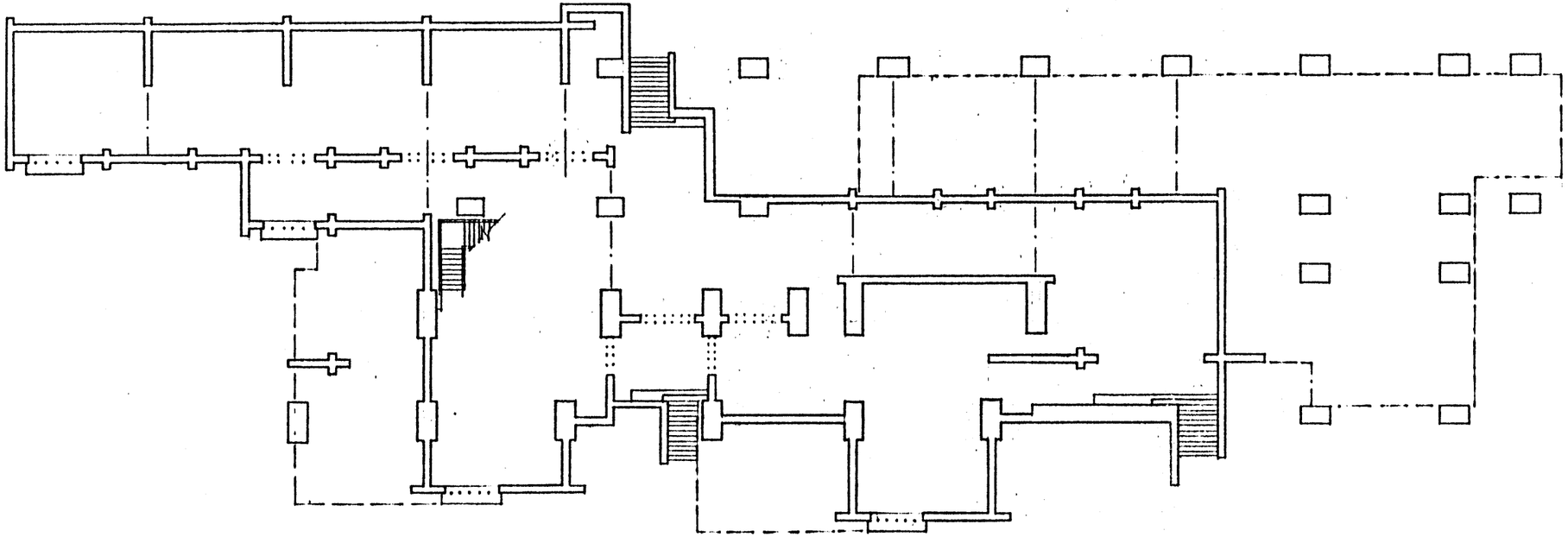
SECTION C

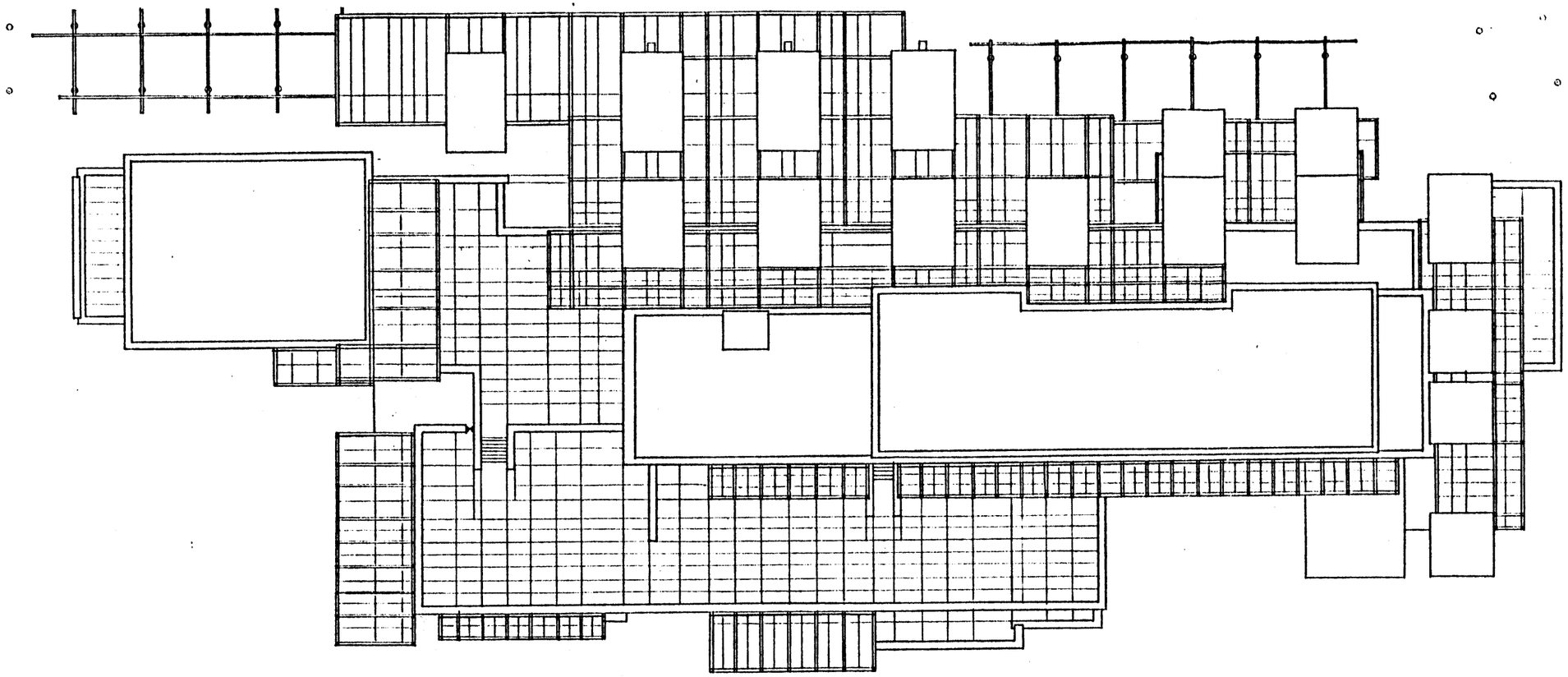
1/16"= 1'-0" FINAL SCHEME



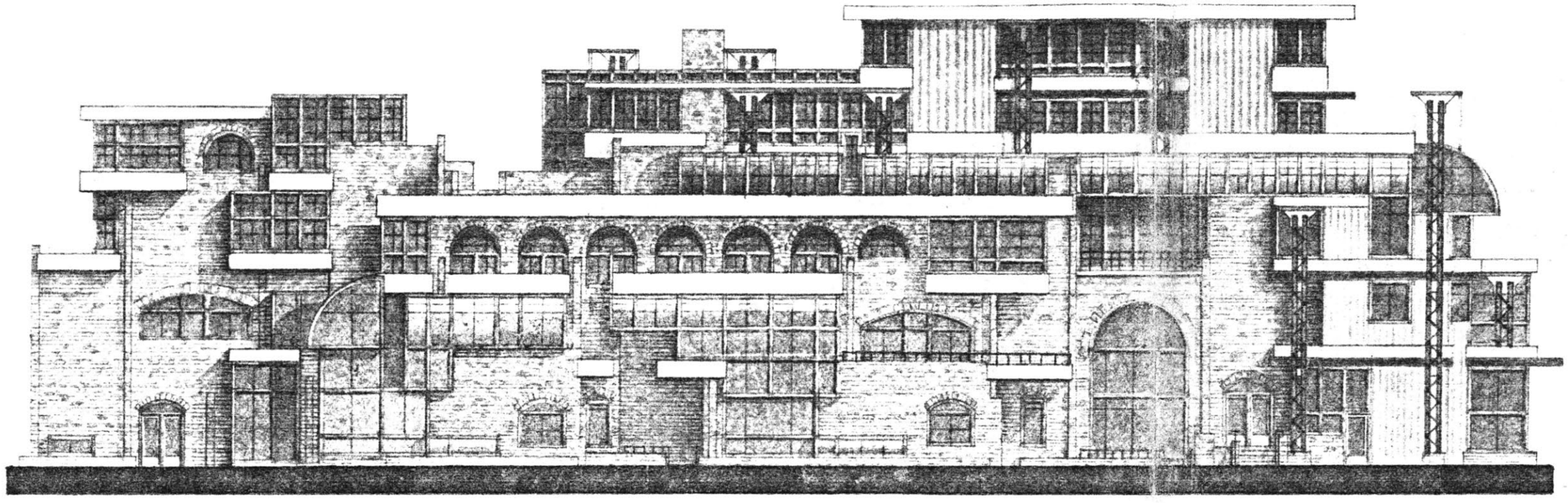

BLACKSTONE STREET
GROUND FLOOR PLAN
NORTH
0 5 10FT.
FINAL SCHEME
CREEK SQUARE

BASEMENT — FOUNDATION PLAN
SCHEMATIC 1/16"= 1'-0"

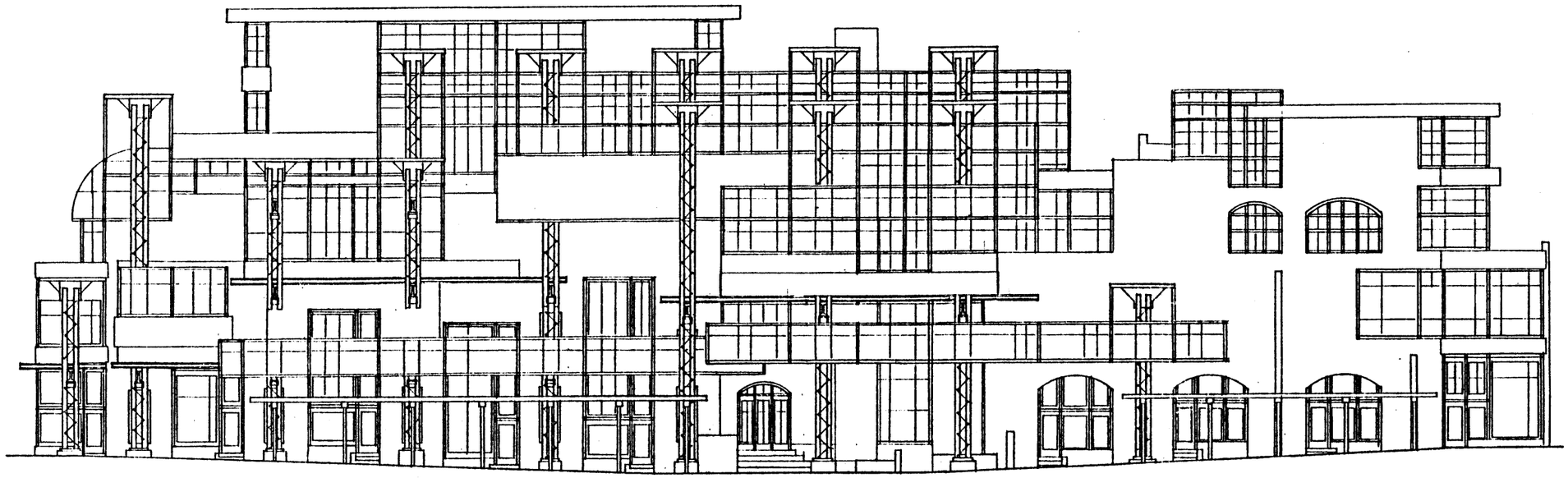




ROOF PLAN 0 5 10 FT.



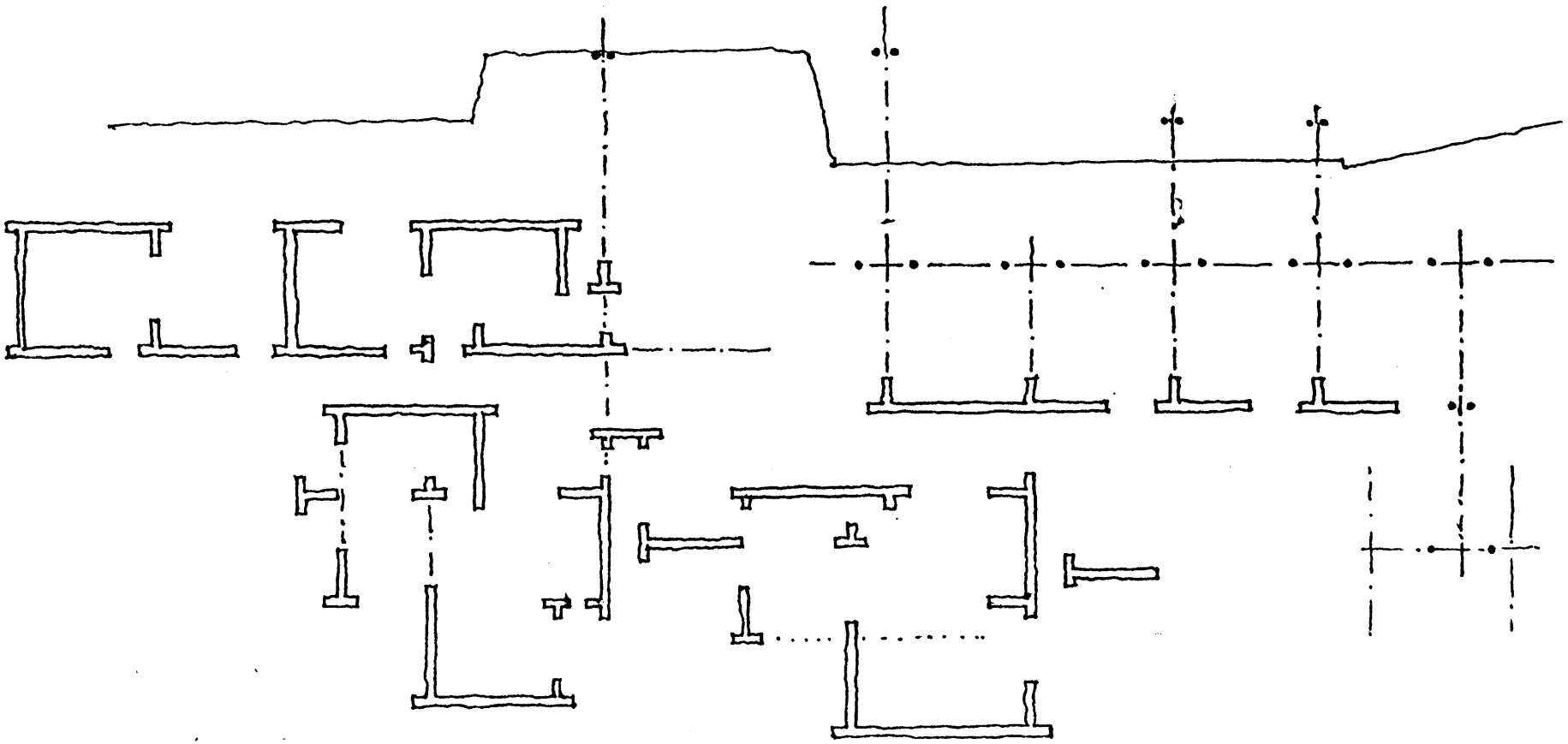
SOUTH ELEVATION



North Elevation

0 5 10 FT.

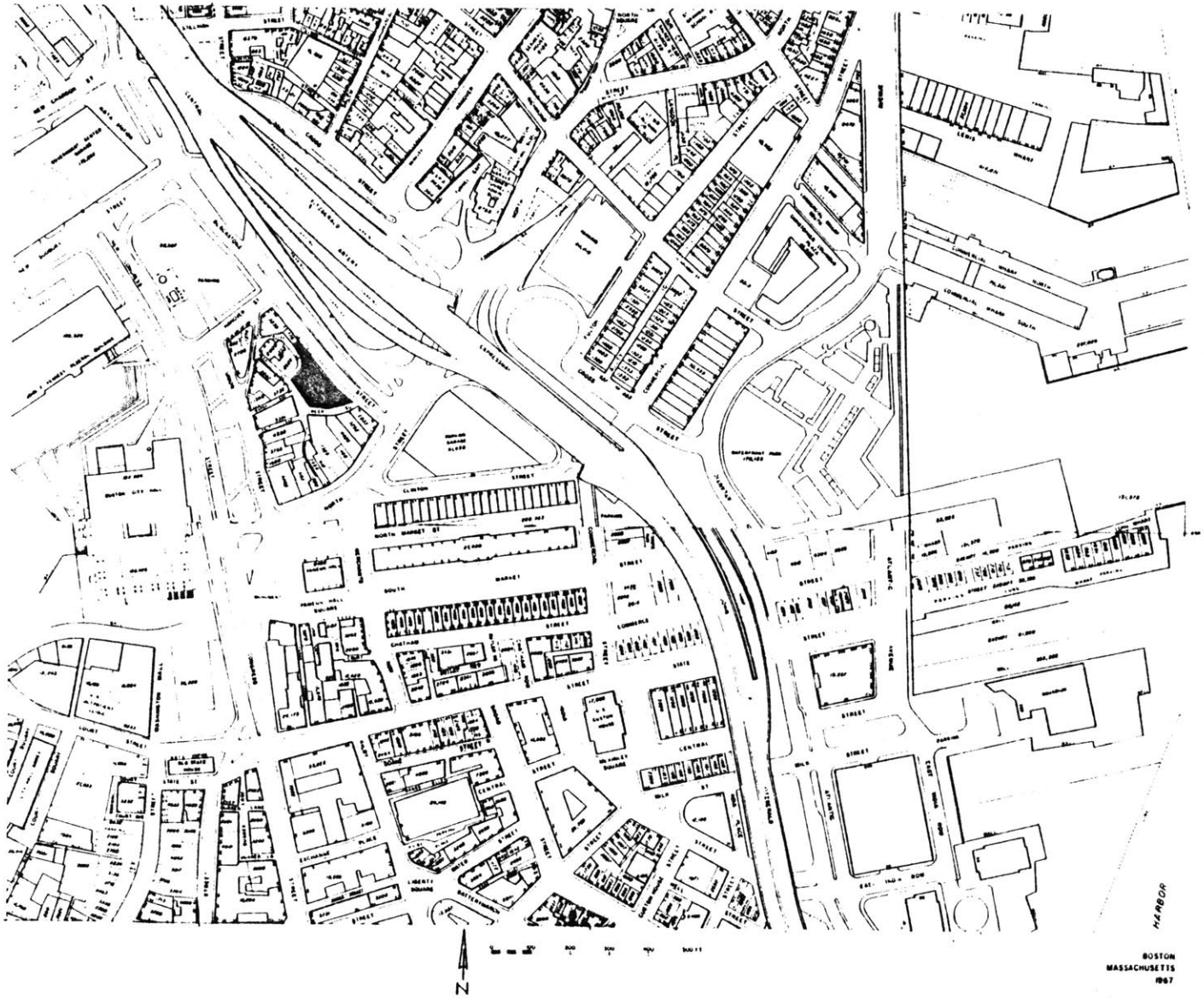
PROCESS AND ANALYSIS



The contention thus far is that associative architecture is more fully realized through consideration of perceptual sequence concepts. However, sequence is only one of many aspects involved in architectural design. Other concerns such as use, adaptability, vocabulary, cost, etc., may at times be more important. All of these concerns have a reciprocal relationship.

The architectural field presented is a site and use specific building. It is a new commercial market, ment to replace some of the existing Haymarket buildings in the city of Boston, close to Quincy Market. Many factors were taken into consideration in the design. Time does not permit a thorough explanation of all of them since the major focus of this exploration is on sequential experience. Nevertheless, this section is intended to serve as a brief description of some of them.

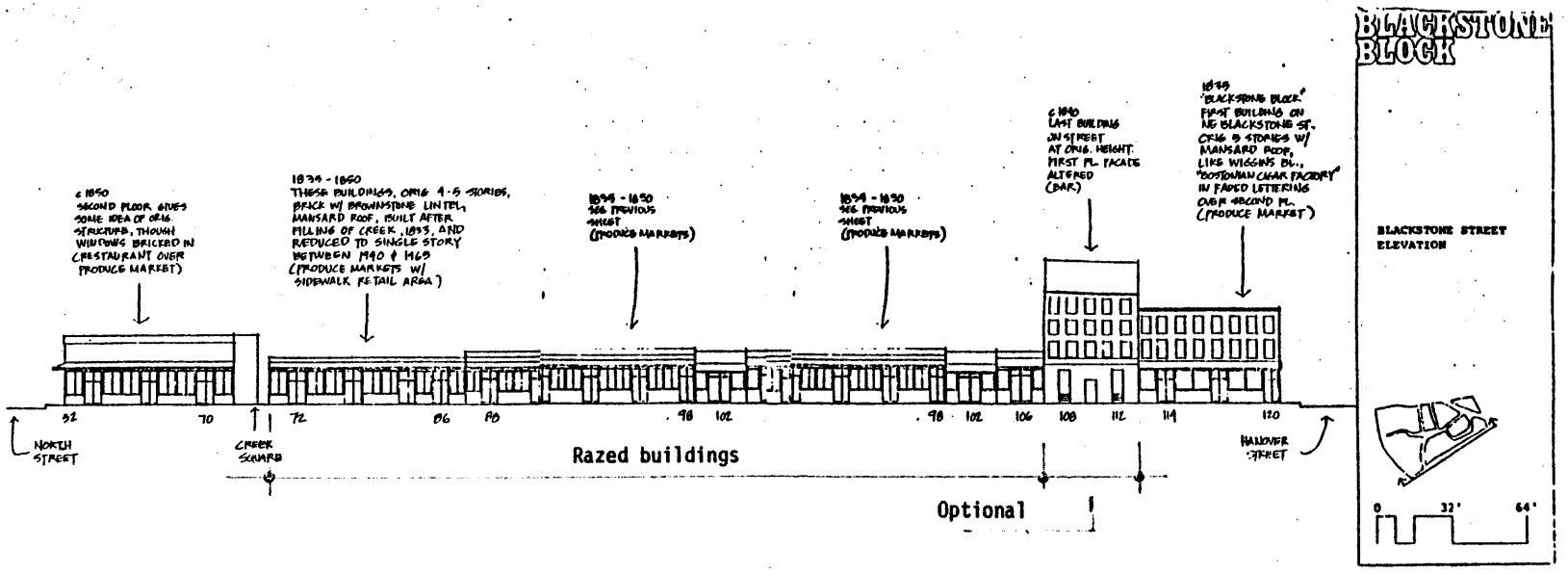
THE SITE



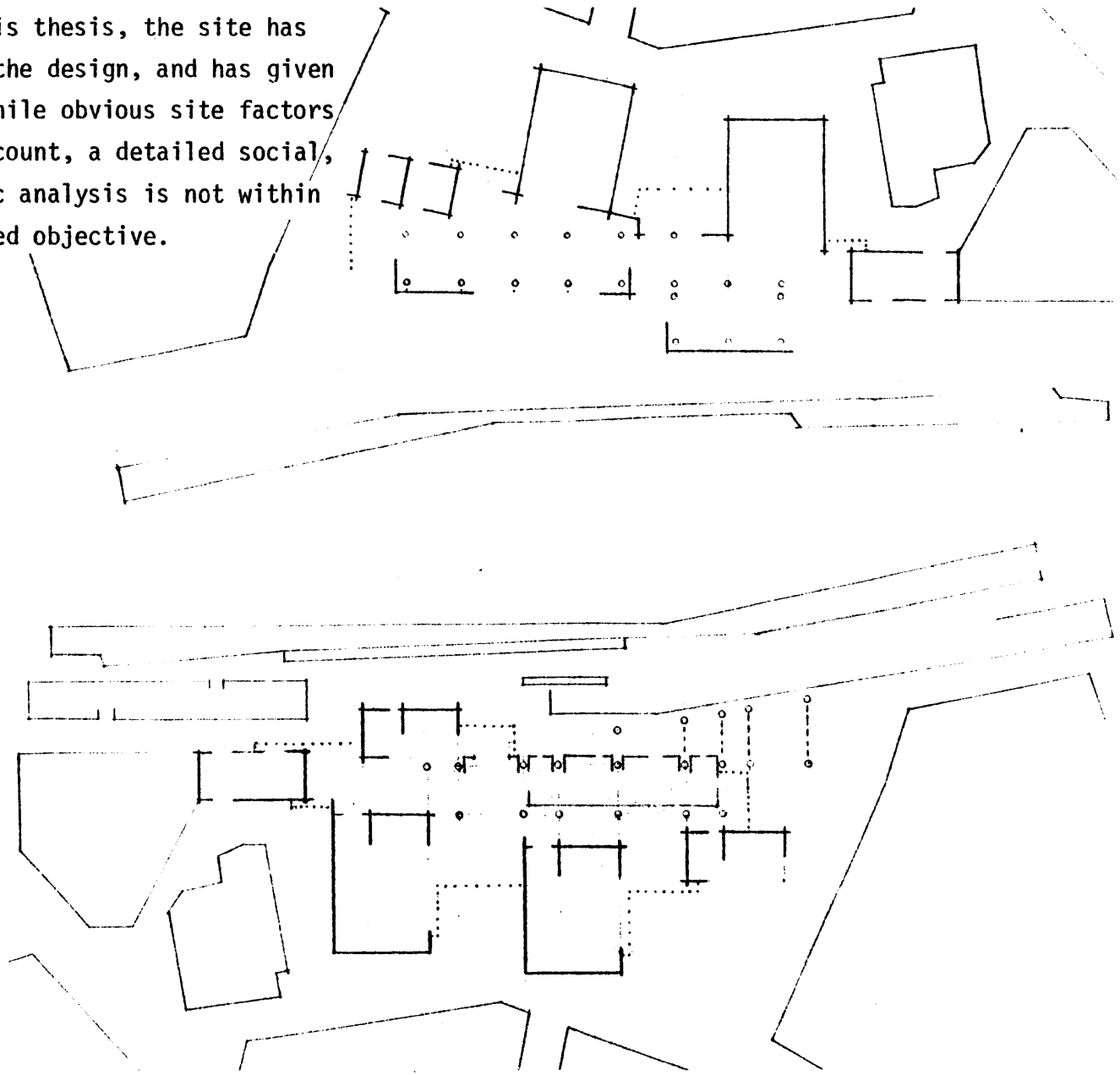
The building site, in downtown Boston, is the section of the Blackstone block fronting Blackstone Street itself and including the open air vegetable market known as Haymarket. In its present state, most of this sub-block consists of rundown one-story structures. Once four and five stories high, over the years they have been chopped down to their present height. It is here assumed that in this instance a historical renovation would be neither practical or economically feasible. For these reasons the design presented presupposes the eventual razing of these one-story remains.

This sub-block presently houses vegetable, cheese and meat stores; several fast food stores; plus the outdoor market. These commercial uses have been retained and other variable uses have been added, including:

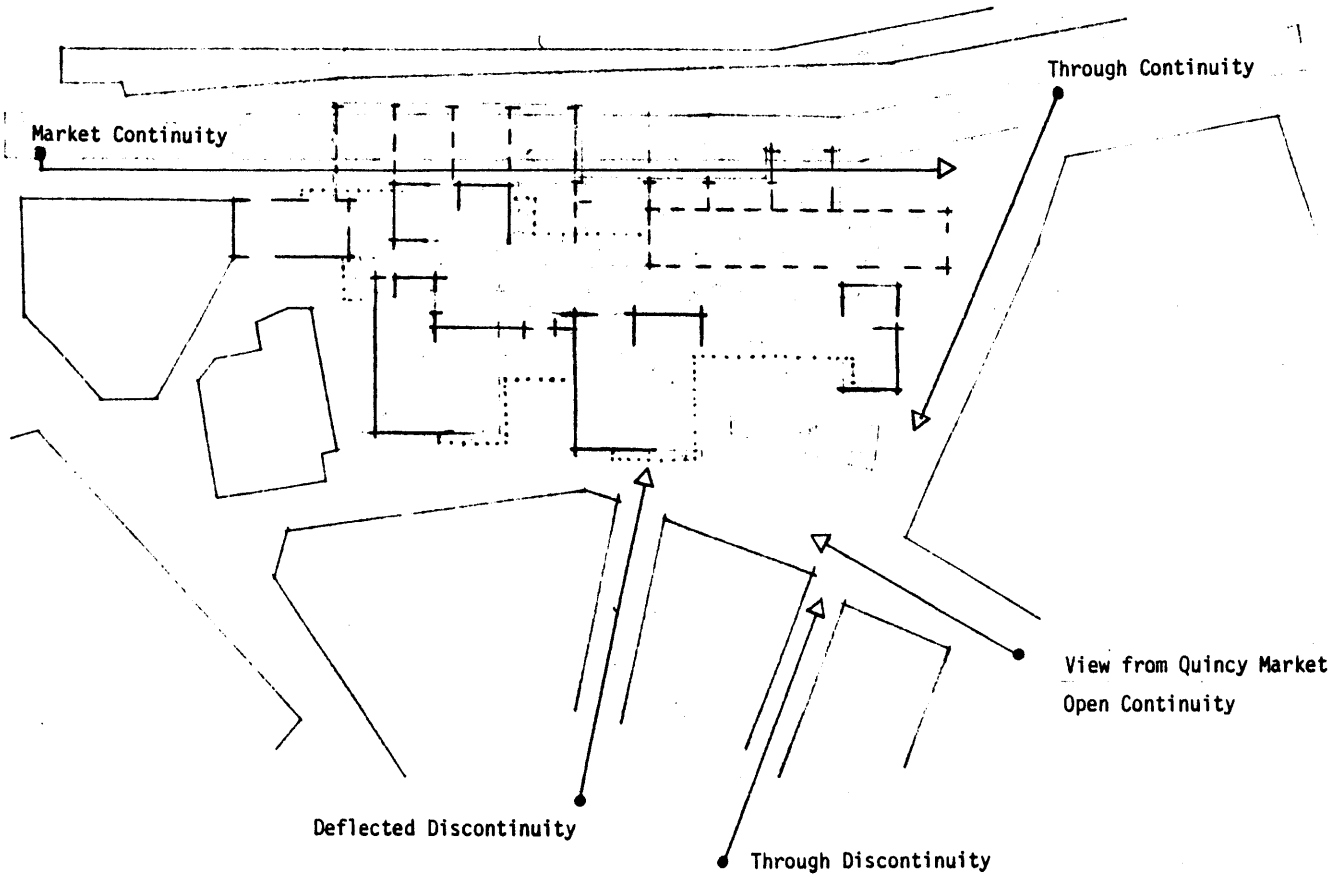
several retaurants
several fast food eateries
two large commercial territories
several elite shops
many existing utility shops
numerous offices
provision for existing outdoor market vendors

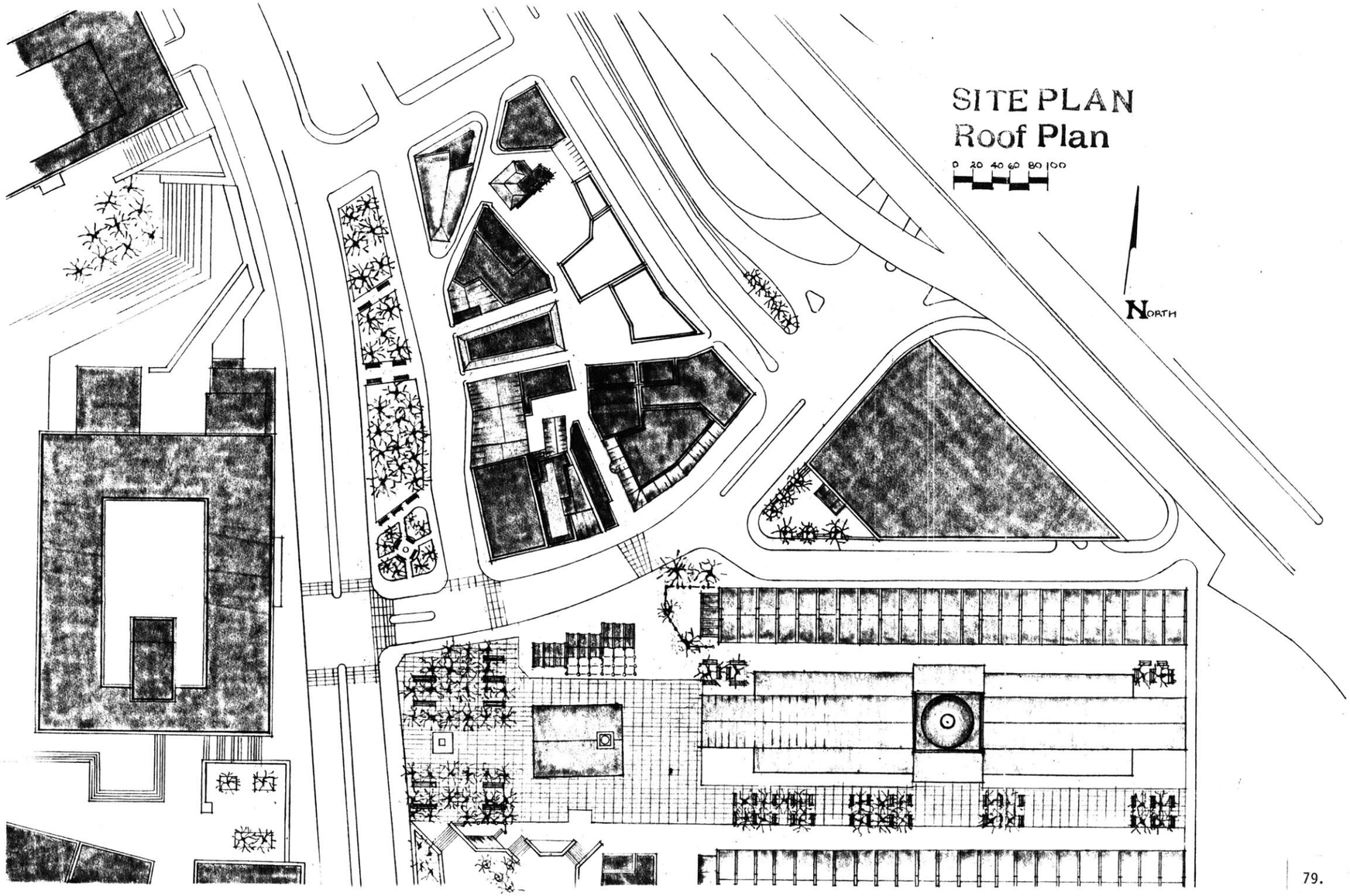


Within the bounds of this thesis, the site has provided a context for the design, and has given clues to vocabulary. While obvious site factors have been taken into account, a detailed social, historical, and economic analysis is not within the realm of the intended objective.



It was felt that the food shops within the market building as it exists, provided the catalyst for the outdoor market. Hence, the existing uses and the linear formal organization were retained. The close meidevil dimensions of the inside streets of the block were also retained, with the exception of the outdoor public territory. The enclosed sense of position which these streets provide is dynamicly juxtaposed to the more exposed feeling of the large public spaces in the area.

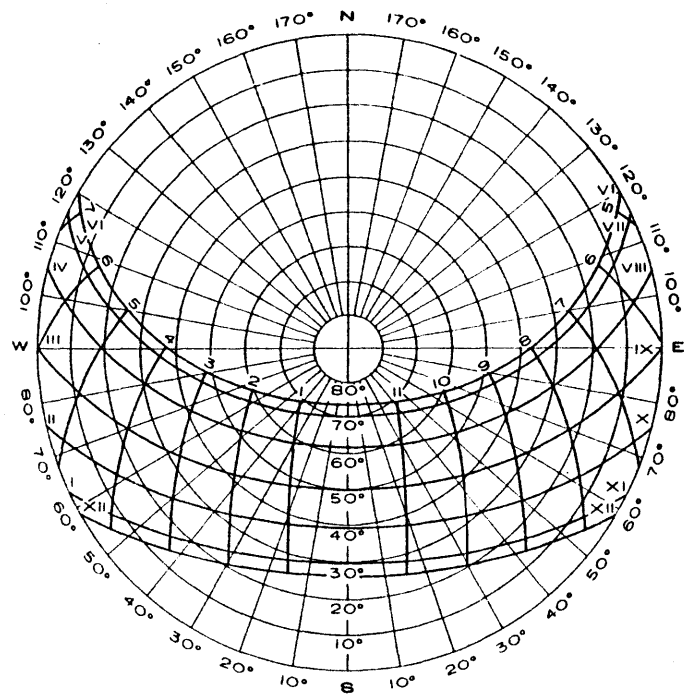



SITE PLAN
Roof Plan
0 20 40 60 80 100
North

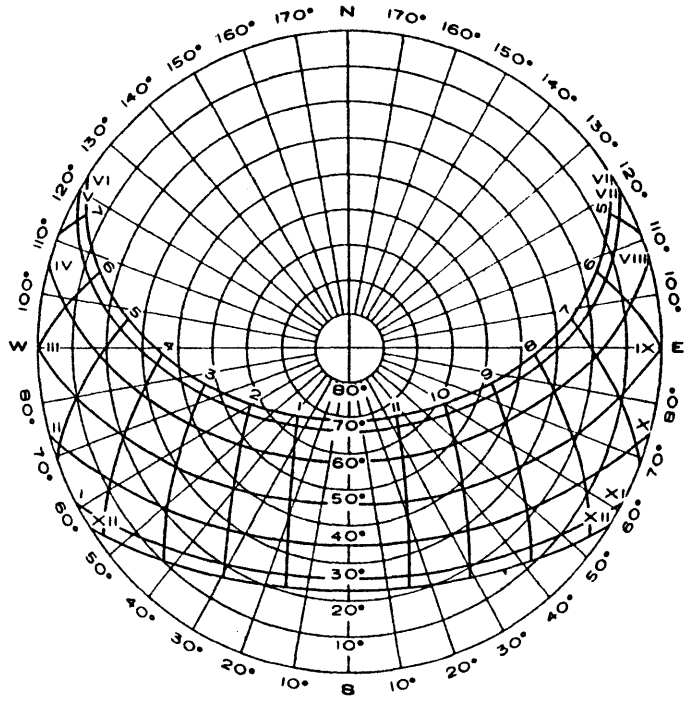
LIGHT STUDIES

In order to determine the general distribution of light on the site, light studies were done at several times of day at key times of the year. The graphic illustration of reasonable extremes in the light permitted mental interpolation of the full range throughout the year, thus providing a minds'-eye motion picture of the changing light distribution.

This tool proved valuable in determining the best spatial placement of different types of use territories. As can be seen in the studies, the light distribution reinforces the decision, based on precedent and topology, to leave the "go" uses such as the market, on the north side and place "stops", such as retaurants and public territories on the south side. Knowledge of the light distribution was also valuable in determining light penetration into and through the architectural field.

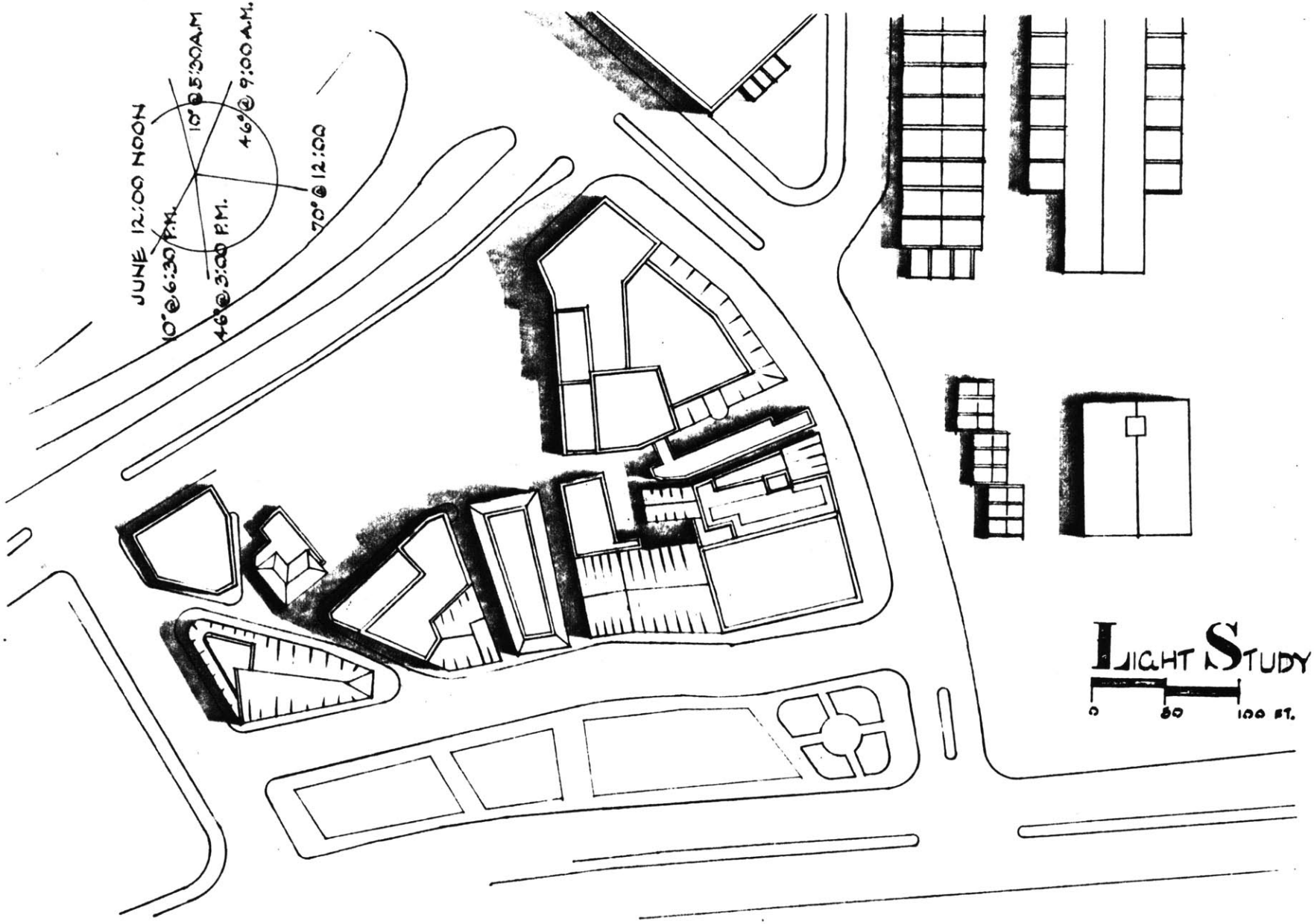


40°N LATITUDE



44°N LATITUDE

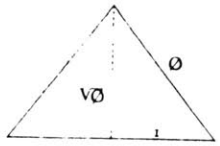

JUNE 5:00 P.M.
@ 25°
LIGHT STUDY
0
50
100 FT.


JUNE 12:00 NOON
10° @ 6:30 P.M.
46° @ 3:00 P.M.
70° @ 12:00
10° @ 5:30 A.M.
46° @ 9:00 A.M.
LIGHT STUDY
0
50
100 FT.


JUNE 7:00 A.M
@ 25°
LIGHT STUDY
0
50
100 FT.

DECEMBER 12:00
10°@3:00P.M.
10°@3:00A.M.
25°@12:00
LIGHT STUDY
0
50
100 FT.

DIMENSIONAL ANALYSIS



In order to determine workable dimensions in the design, existing markets were analyzed. Listed here are the most important dimensional results:

Haymarket

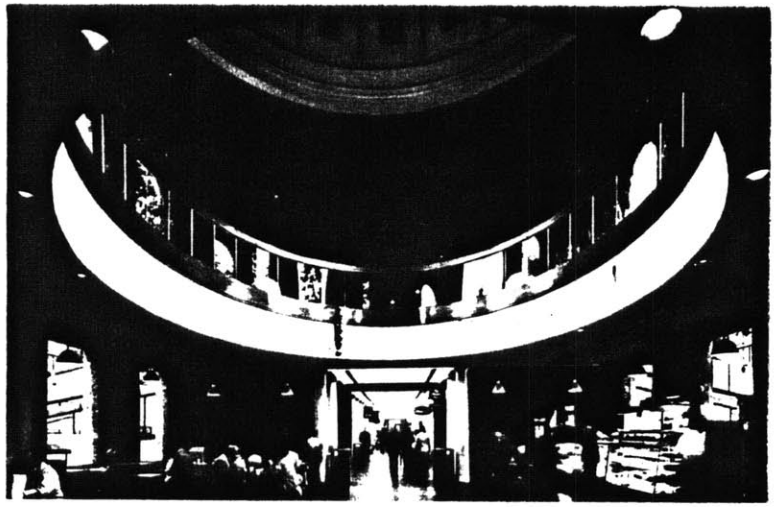
access width	10 to 12 ft.
access length	400 ft.
typical booth width	16 ft.
shop size	30 x 30 ft. to 16 x 20 ft.

Quincy Market

indoor access width	12 ft.
access length	220 ft.
	+ 70 ft.
	+220 ft.
outdoor access width	30ft. and 80ft.
typical booth width	16 ft.

Star Market

access width	7 to 14 ft.
access length	76 to 112 ft.

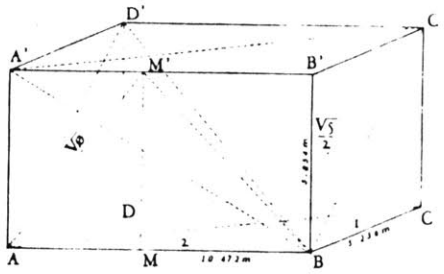


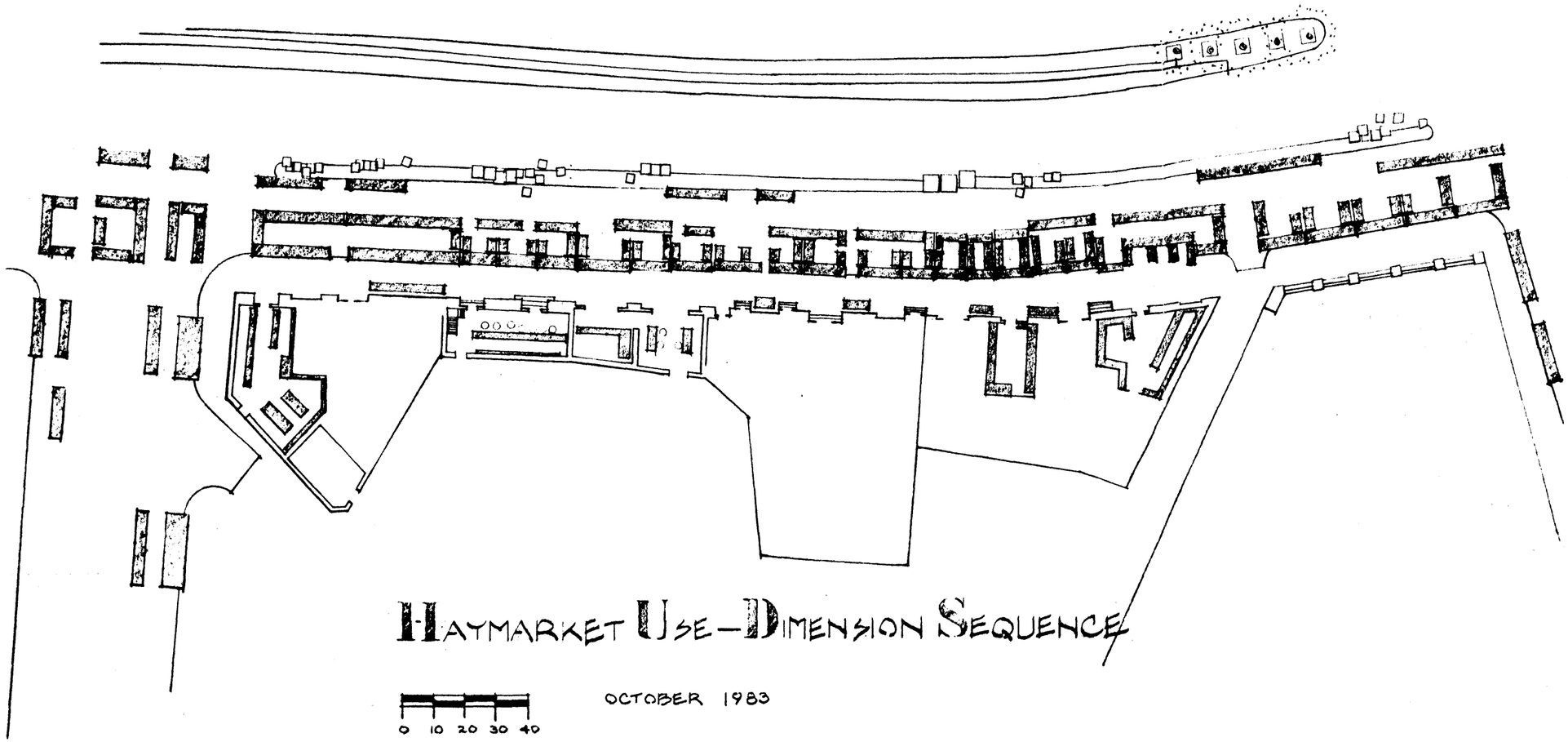
39

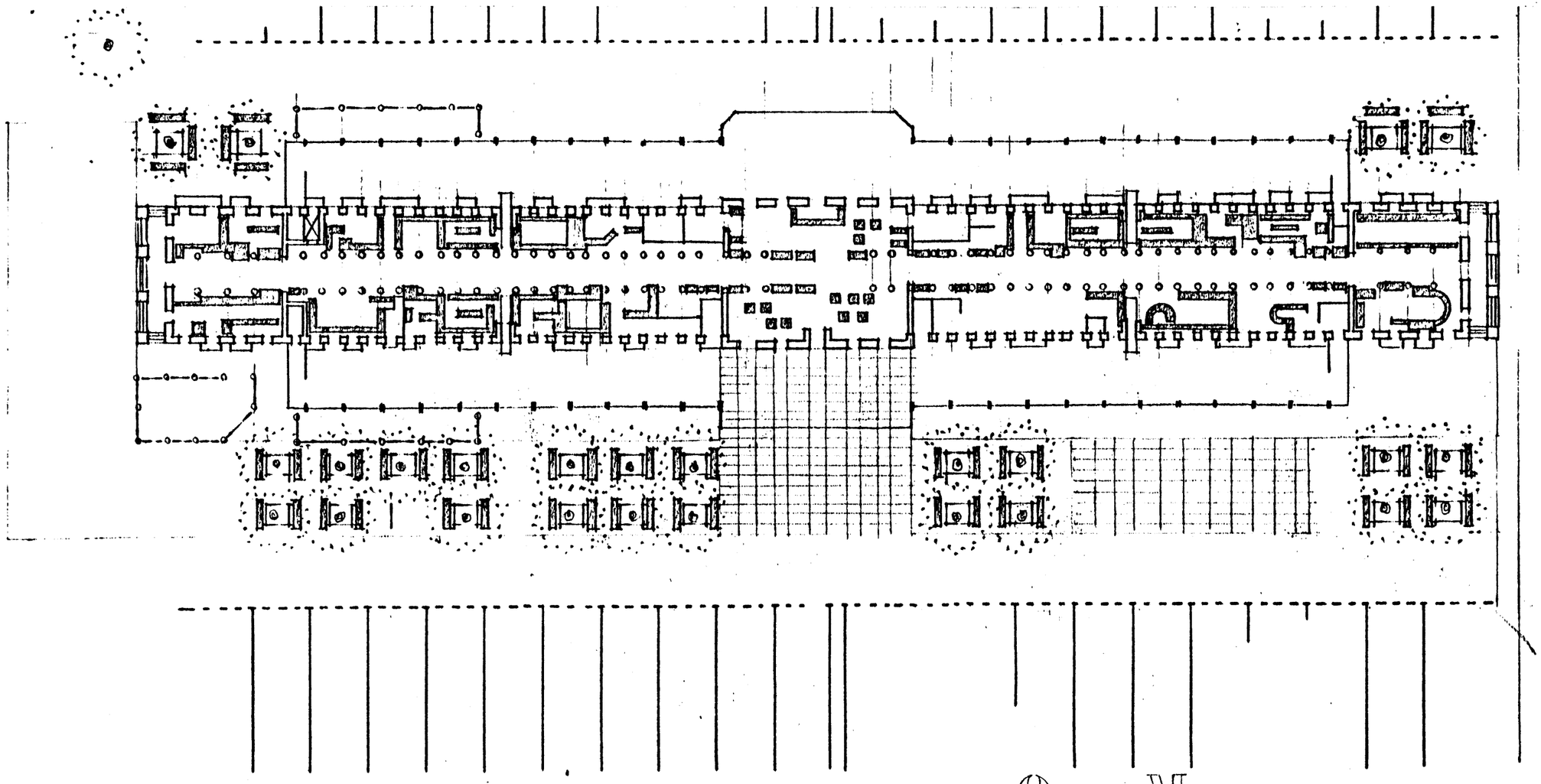
In the three examples studied, a very close correlation was found in the market access widths, the largest being fourteen feet. This suggests that the access width found in the typical suburban mall is much too large for a market, and that fourteen feet should be the

40

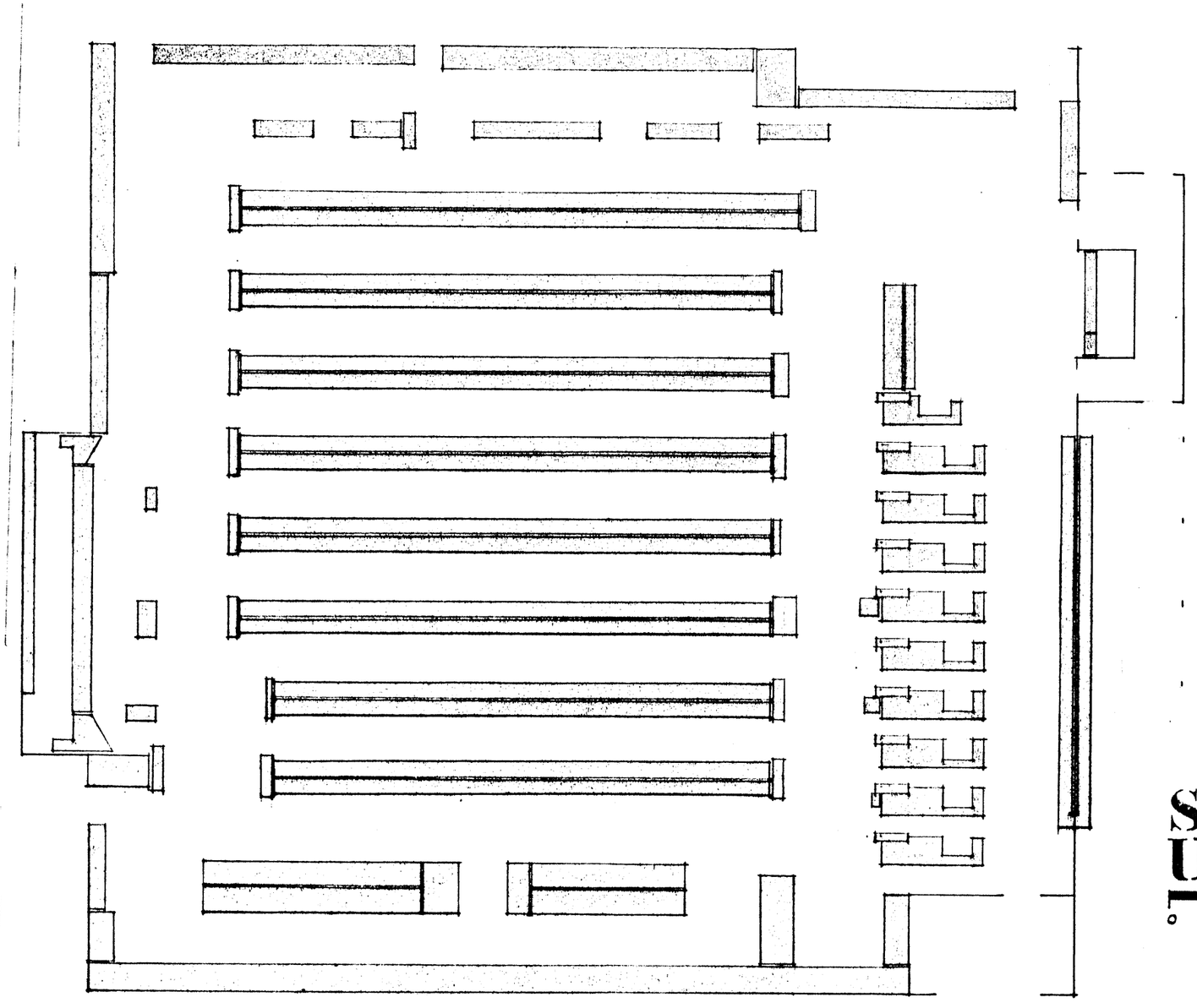
maximum access width for the market.
It was felt that the 400 foot unbroken length of the Haymarket access was too long. This observation was supported by the Quincy market study. Here two 220 foot access lengths are divided by a 70 foot break. Hence, it was decided to break the market into two sections with a public entry space.




HAYMARKET USE–DIMENSION SEQUENCE
0 10 20 30 40
OCTOBER 1983



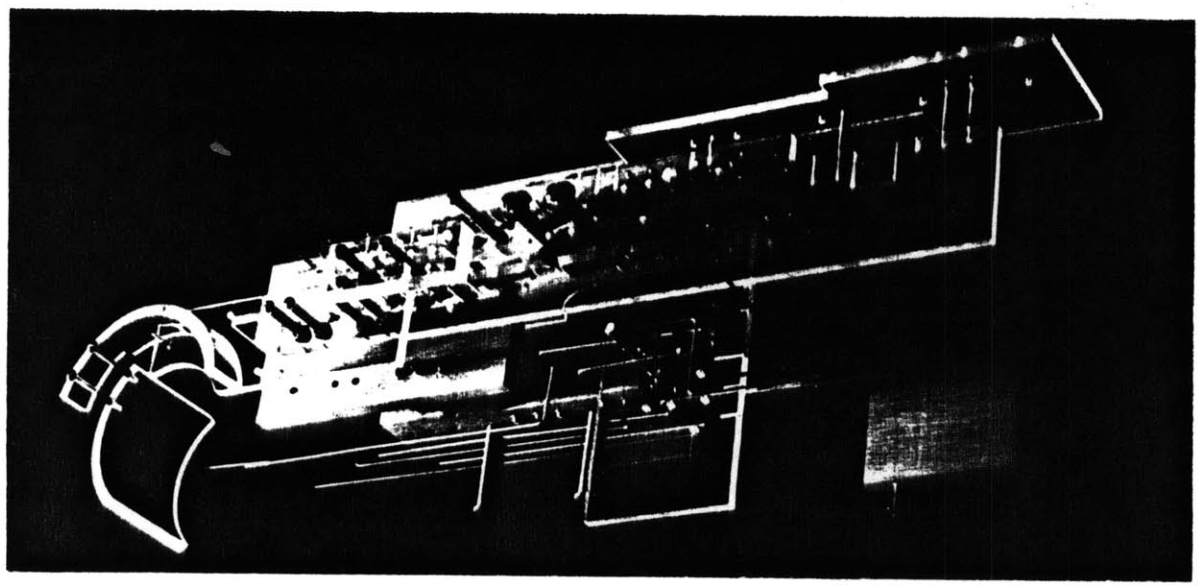
QUINCY MARKET
DIMENSIONAL
ANALYSIS

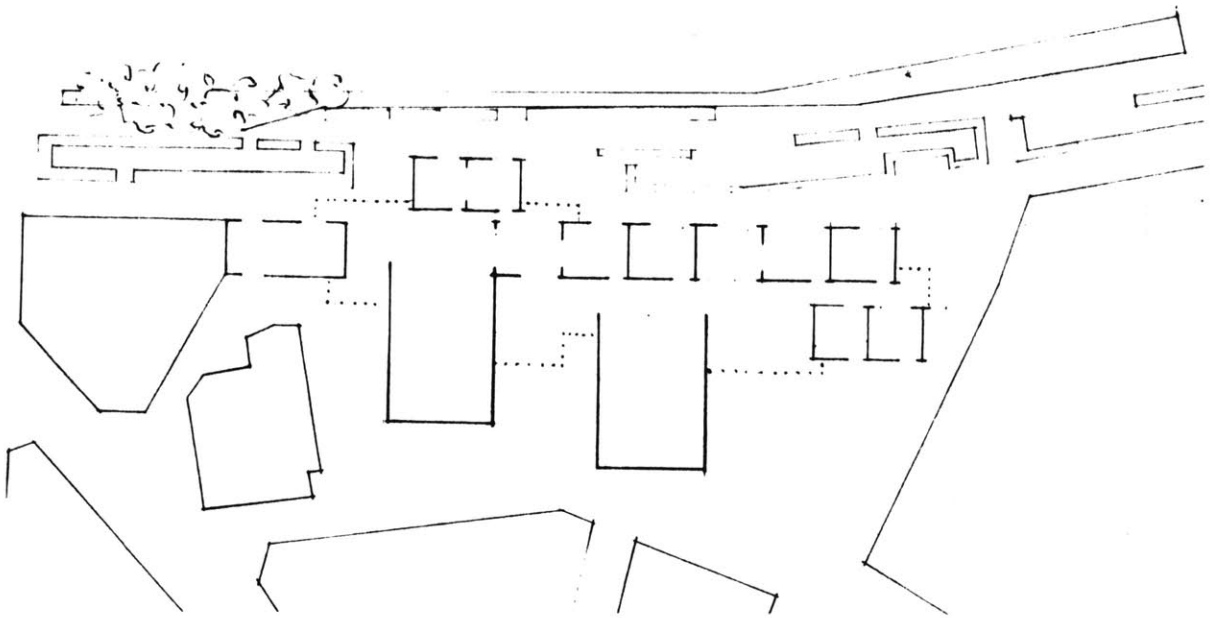


STAR MARKET
USE - DIMENSION SEQUENCE

0 4 8 12 16 FEET

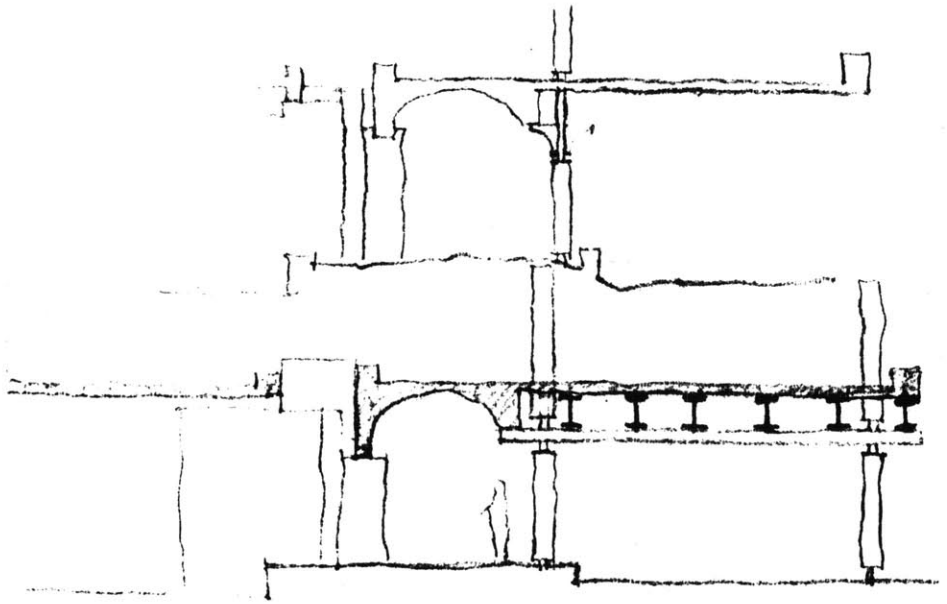
ABSTRACT SPATIAL STUDY

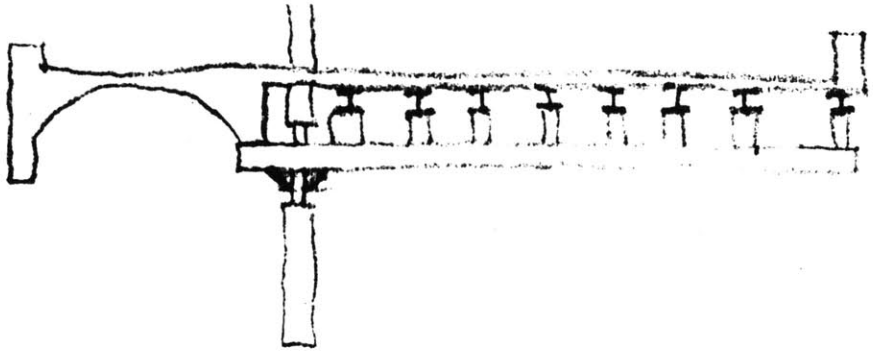


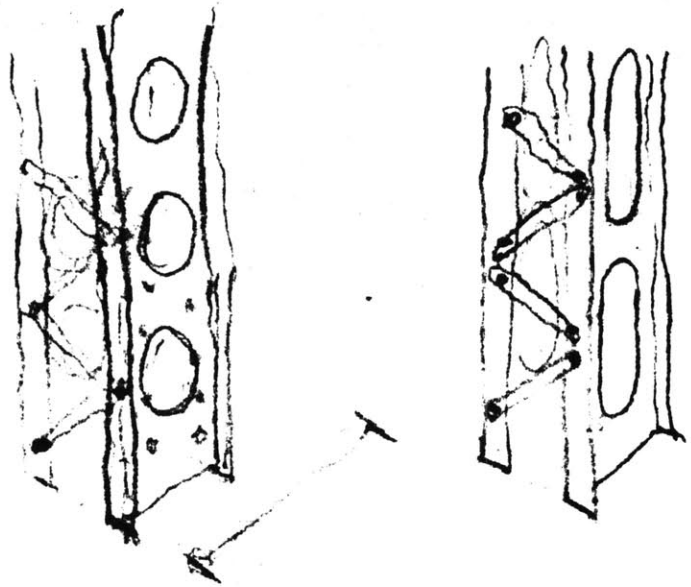


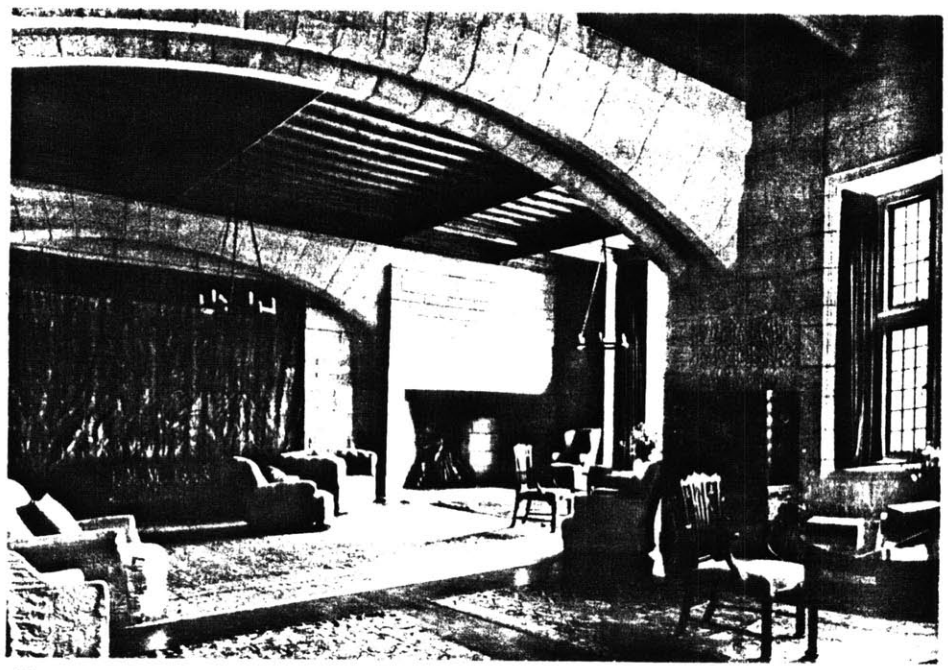
VOCABULARY

As evident in the site diagrames and field studies, it was decided early in the design, to use two differant structural systems. Load bearing brick was selected for the south side. It was felt that this material related well to the brick and stone of the historic buildings adjacent to this elevation. Additionally, brick helps to preserve the medieval character of the inside streets of the block.
The north elevation faces the Fitzgerald Expressway. A steel framework is employed on this side. Here, the use of steel adds various possibilities for infill, economy, and makes the greater height needed on this side easier to achieve. It is planned, that the steel frame be fireproofed with intumesent mastic coatings.









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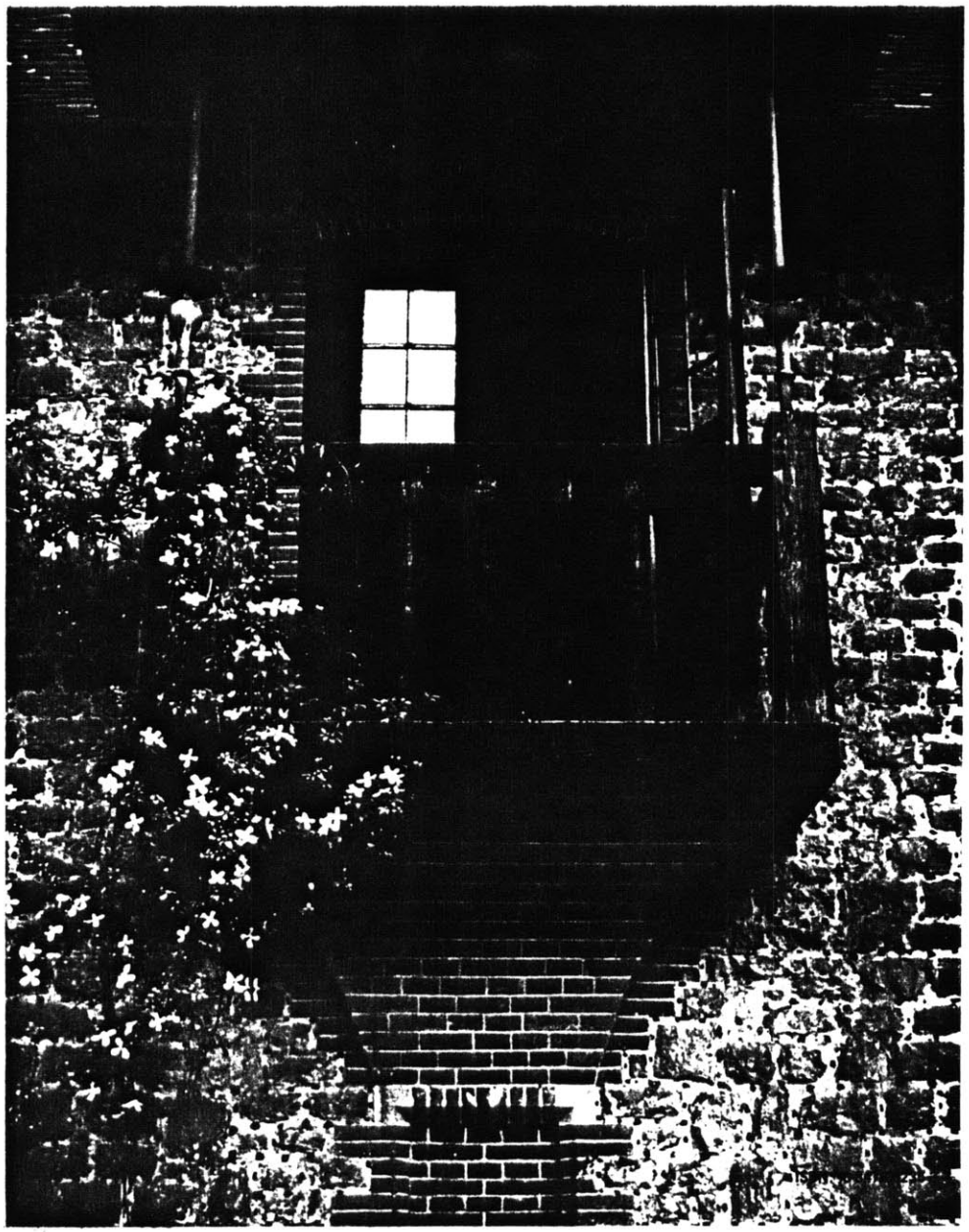
The existing masonry buildings in the site vicinity provided clues to the brick vocabulary. There are both segmental and Romanesque arches. The masonry was deployed as self-stable chuncks within the field. This permitted a more spatial configuration.

However, the intrinsic formal behavior of load bearing masonry arches is in a cellular definition. In a sequential sense, this was used to advantage in providing solid inpenitrable planes, as well as virtual planes to be moved through.



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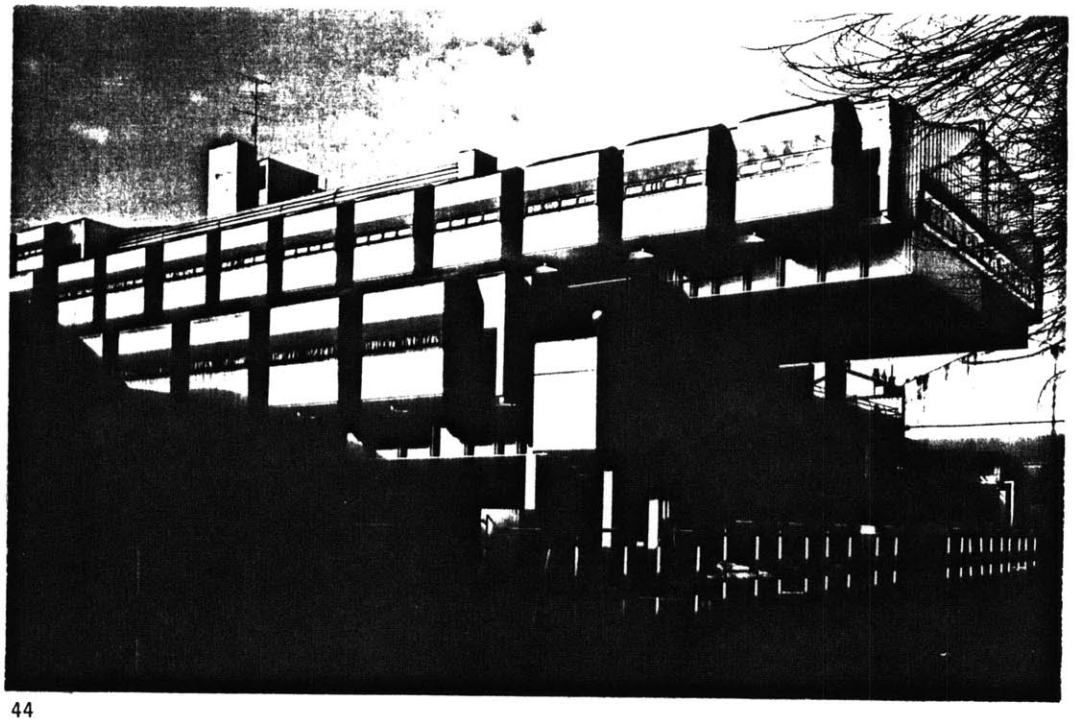

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Vocabulary clues for the steel system required investigation elsewhere. It was felt that the screened quality of light provided by steel buildings at the turn of the 19th century was appropriate to a market building on this site. The contemporary adaptation employed retains the built light within the primary structure. In the access and larger use territories a secondary steel screen system is used to define the overall form of the light.

The primary steel framework is stablized with continuous horizontal slabs and tied to the masonry at various points. This leaves the wall system free to change.

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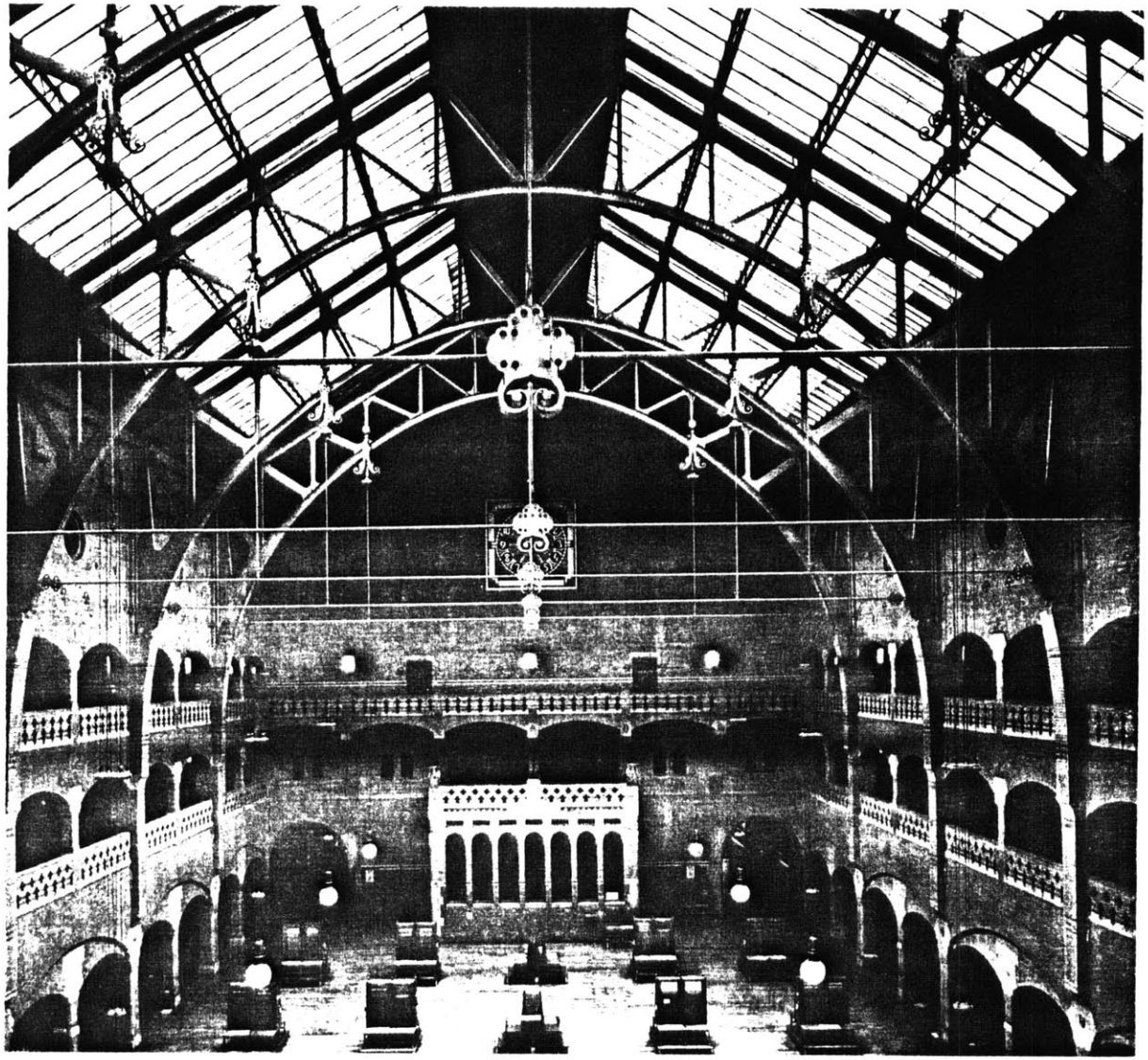
The access is the spatial continuity between the steel and masonry systems. The secondary steel screen system, which supports the lites, is the physical continuity common to both systems.



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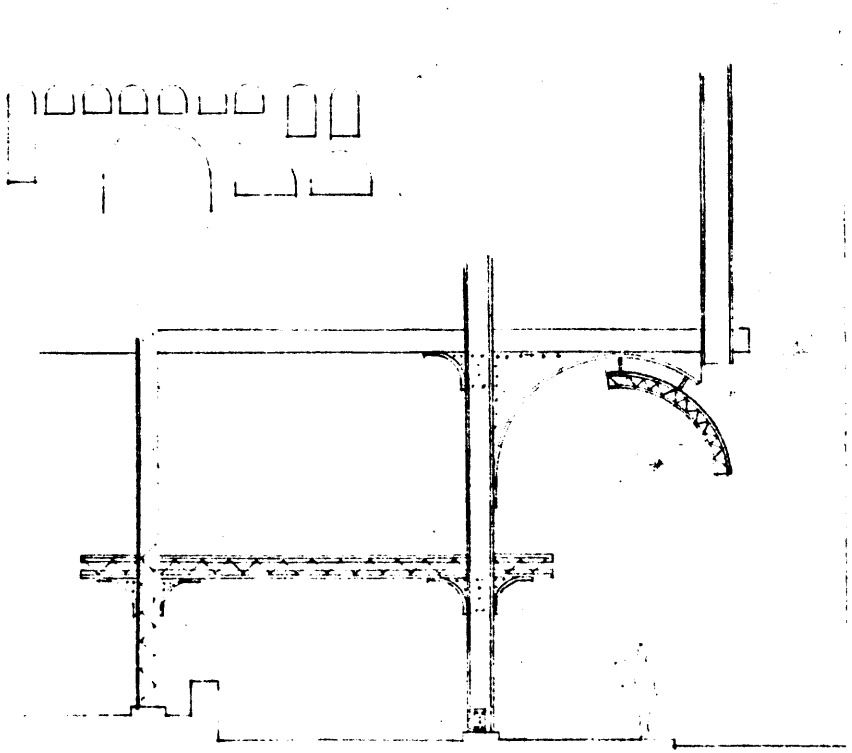
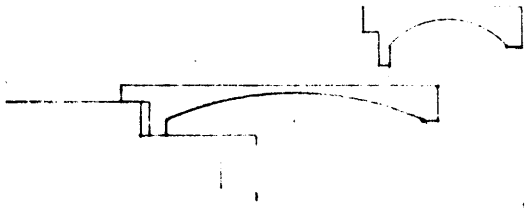
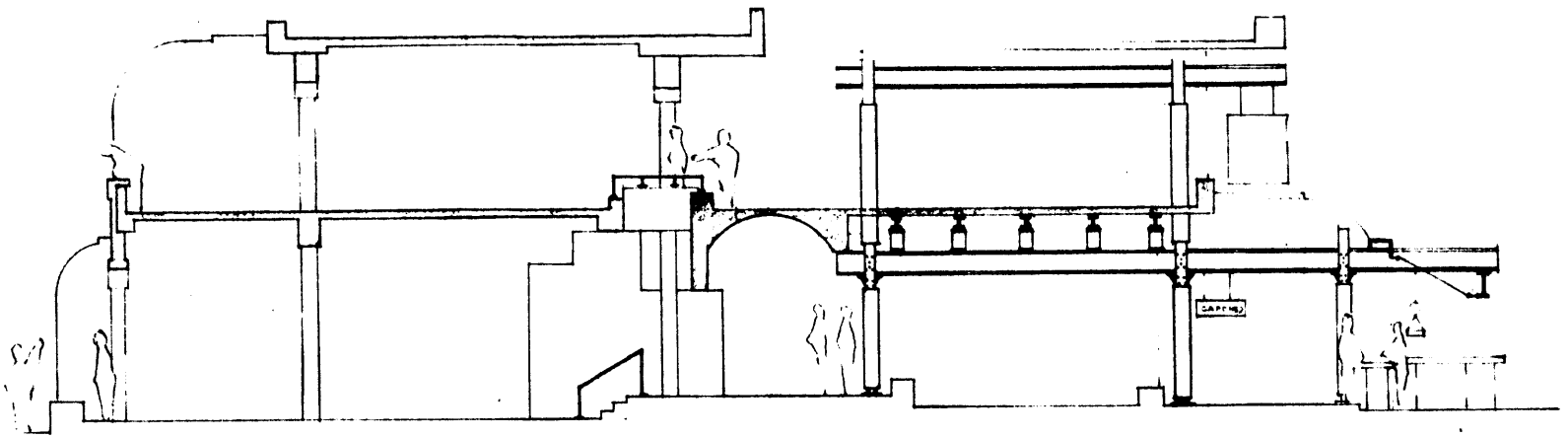
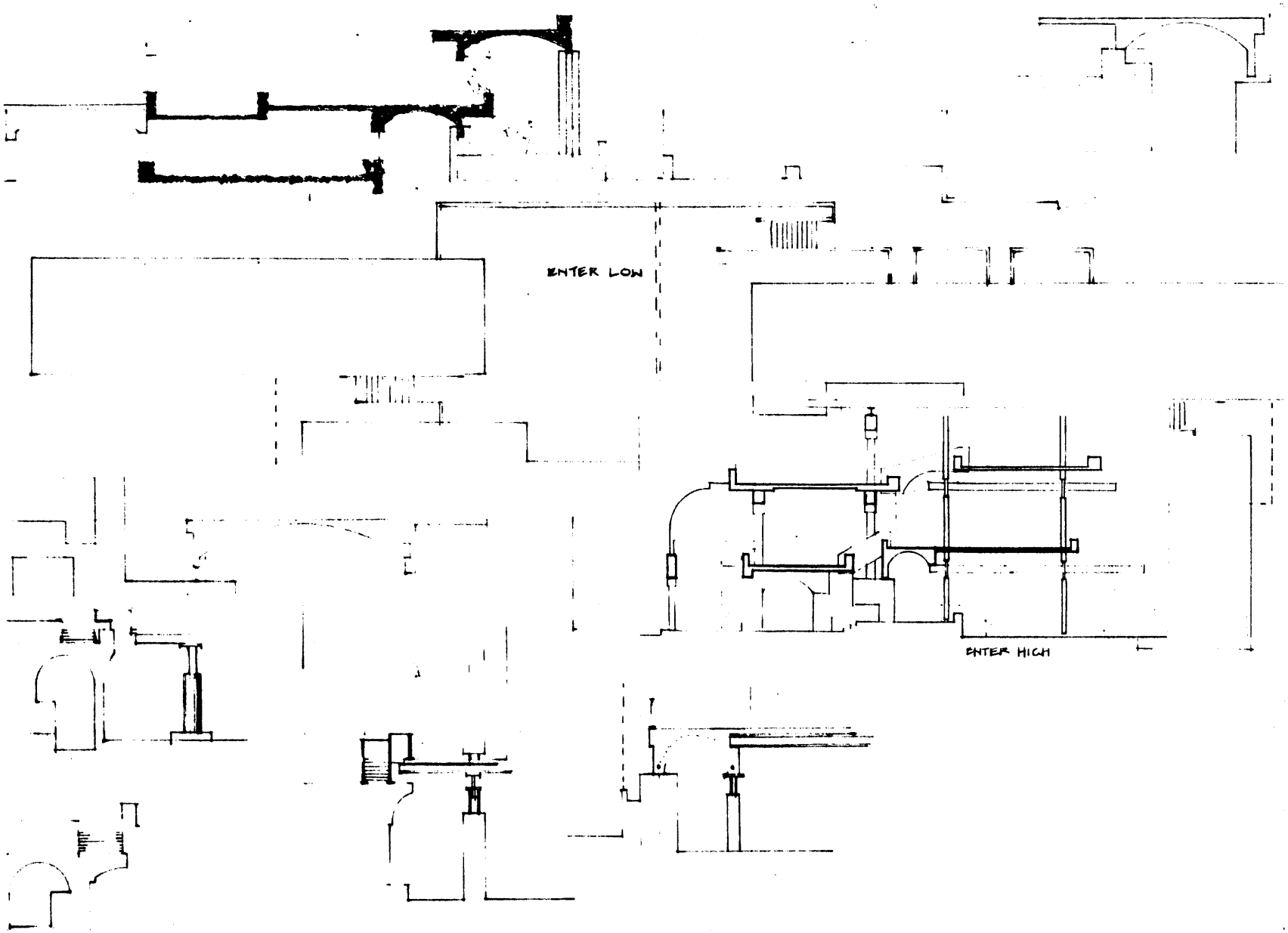
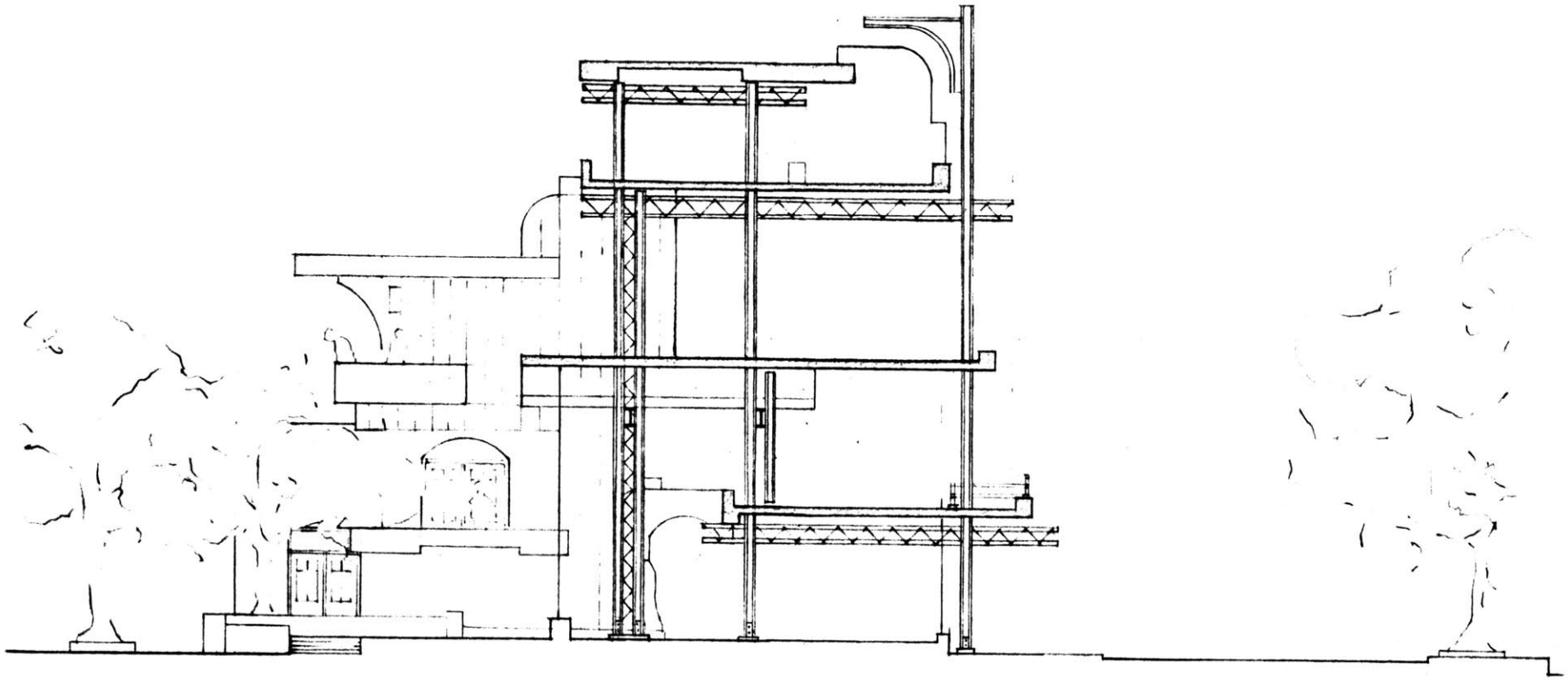




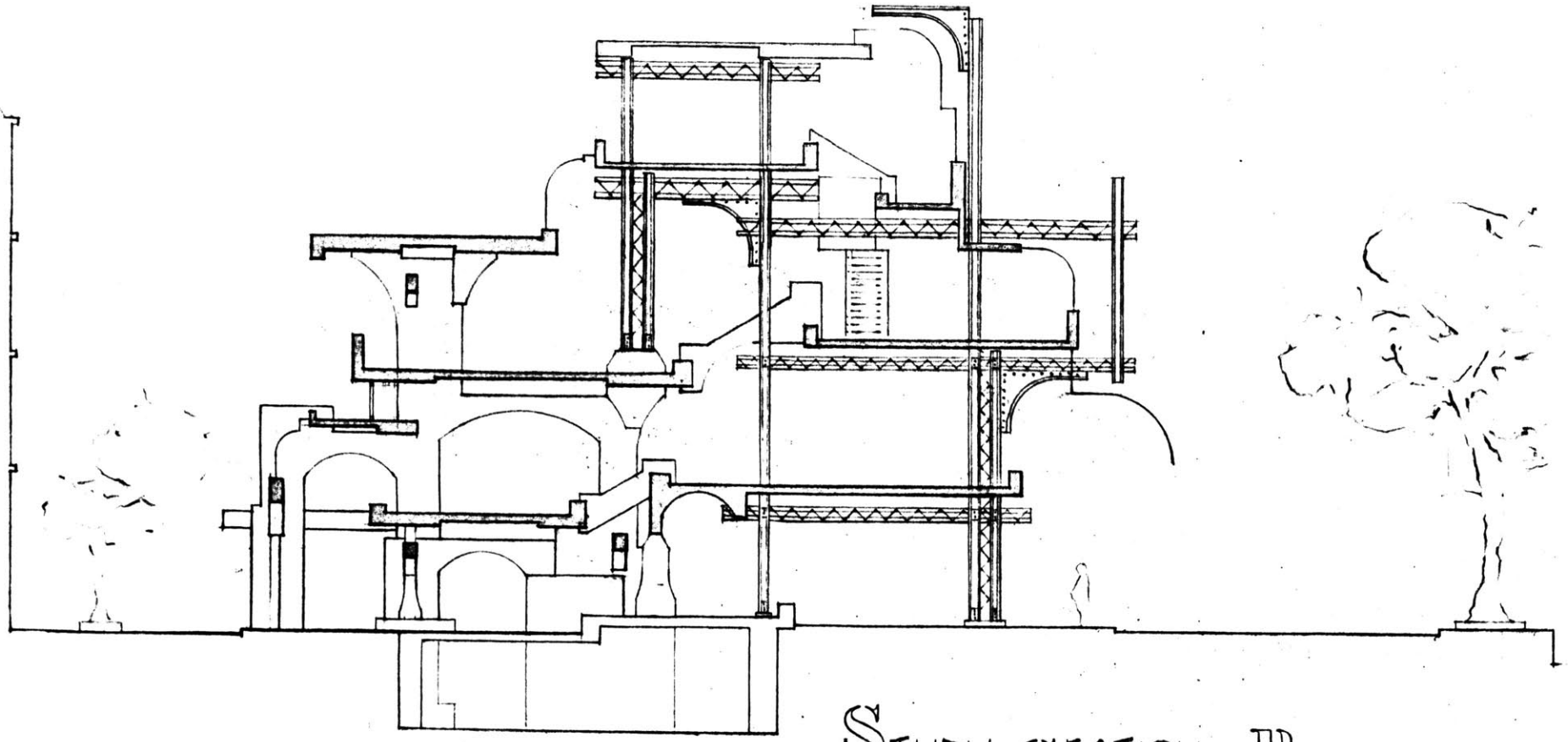



ENTER LOW
ENTER HIGH

MID-POINT PROJECTION

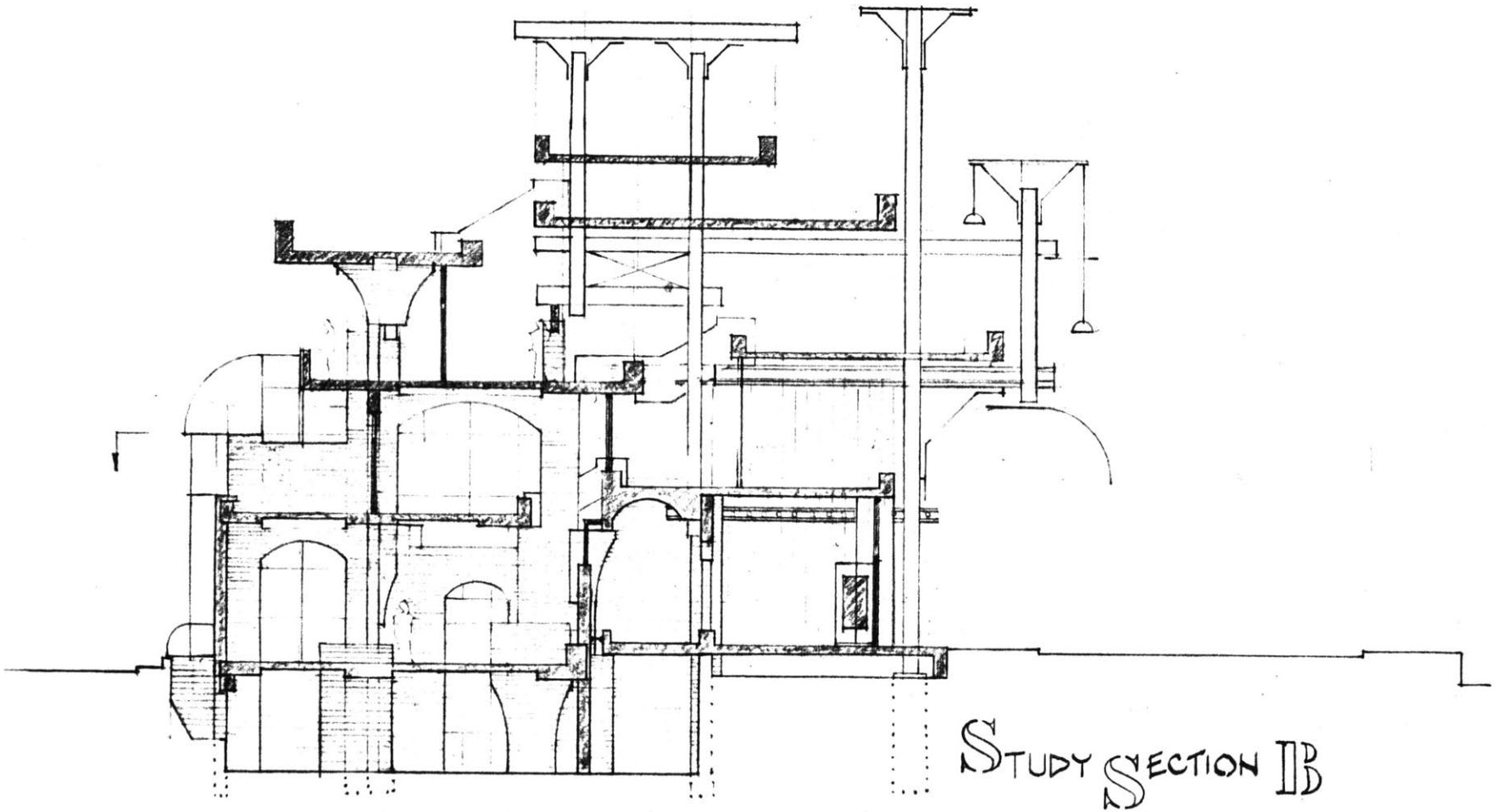


STUDY SECTION A
1/16" = 1'-0"



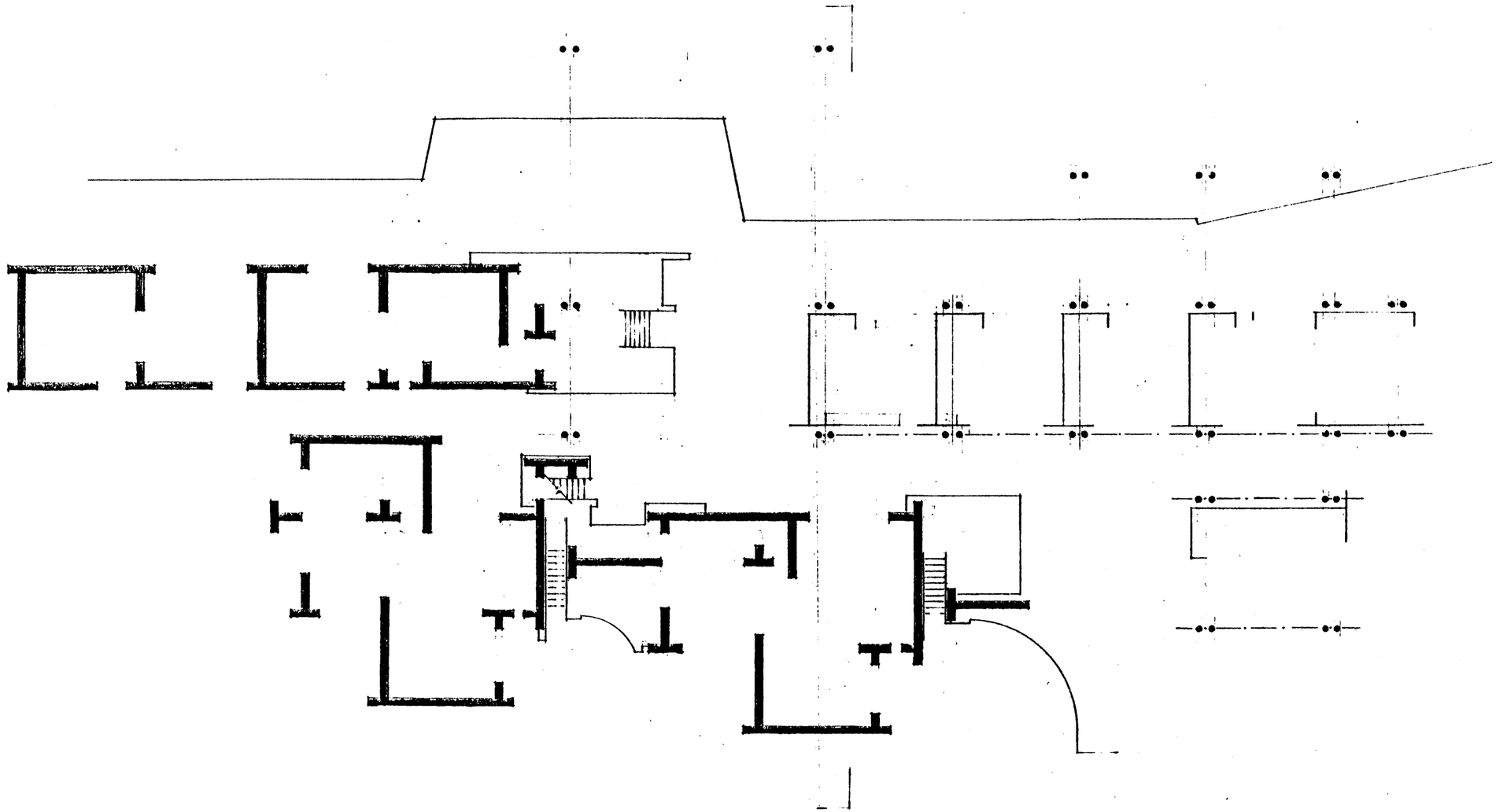
STUDY SECTION IIB

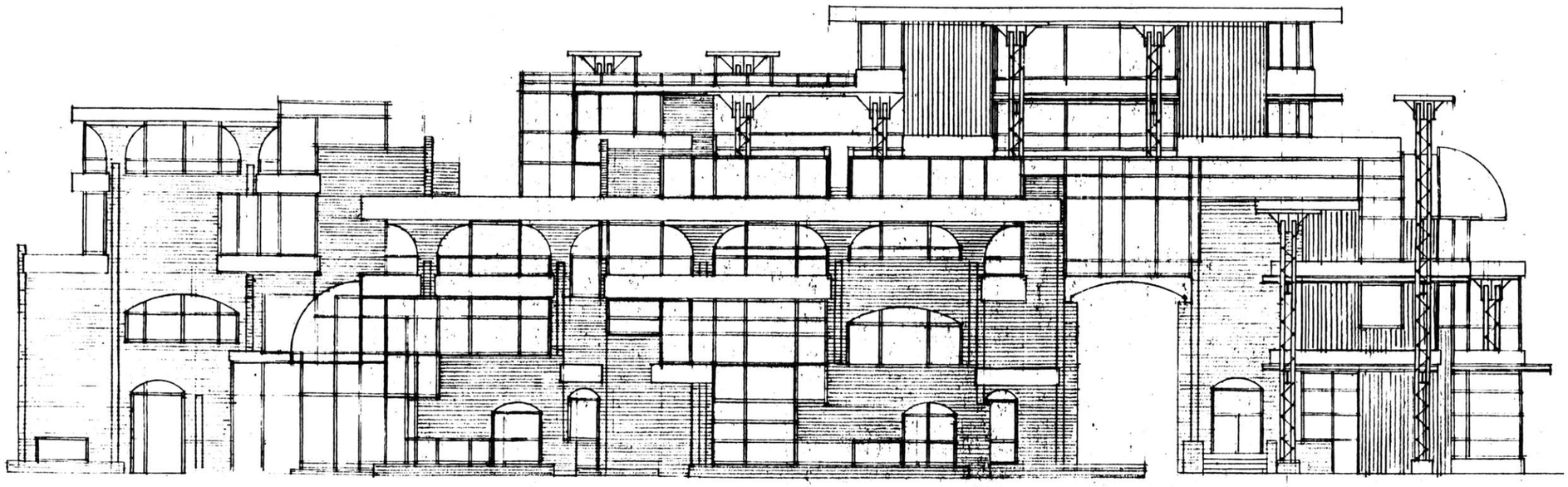
1/16"=1'-0"



STUDY SECTION IB

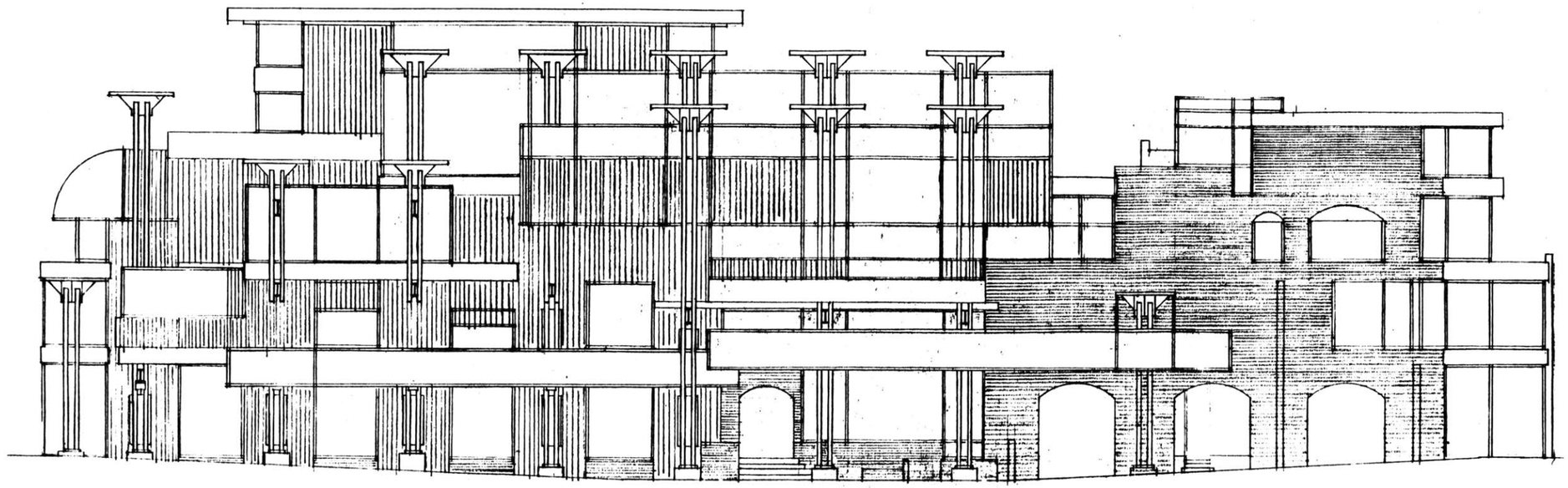
1/16"=1'-0"





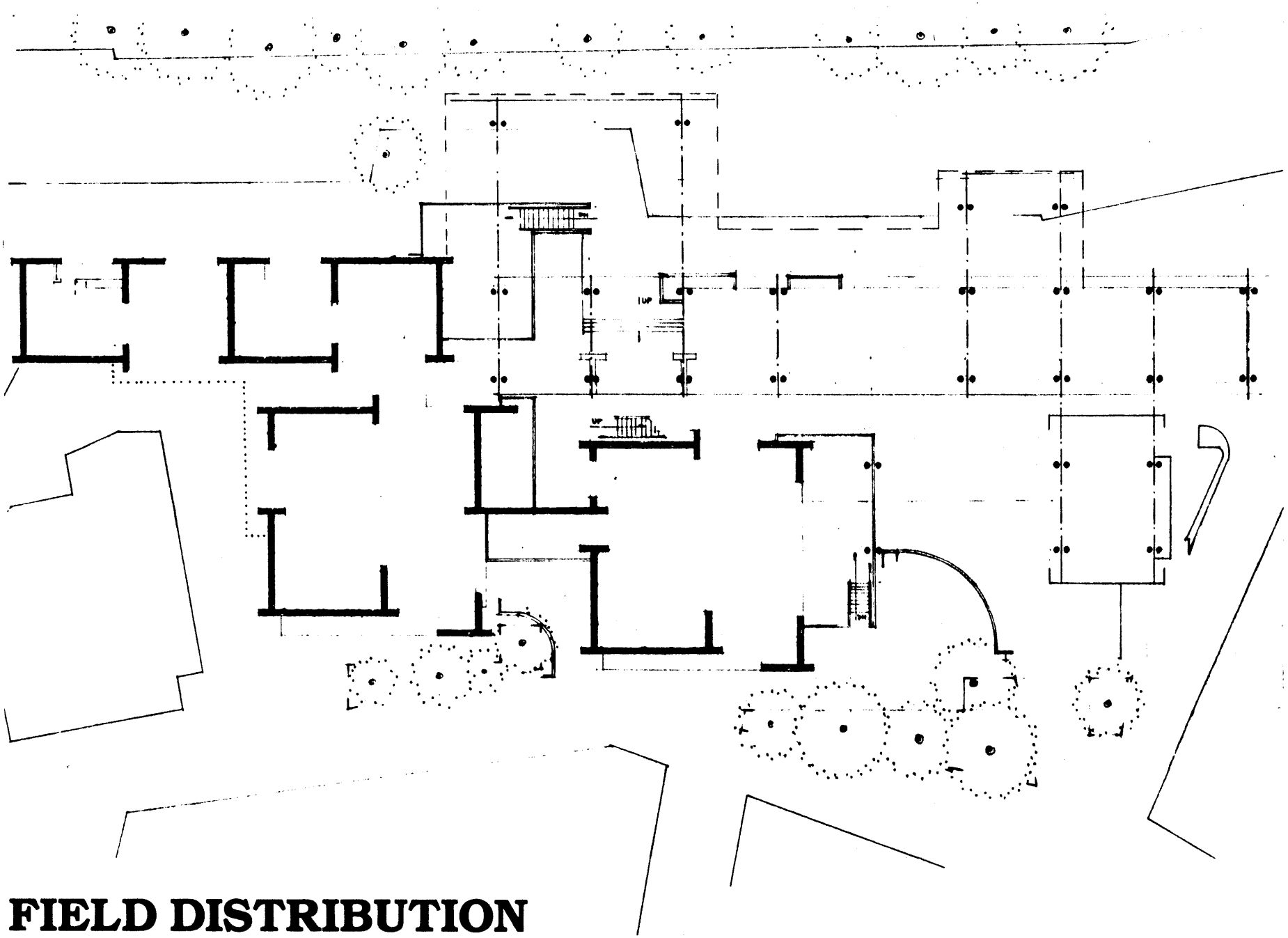
STUDY- SOUTH ELEVATION

CREEK SQUARE 0 5 10 FT.

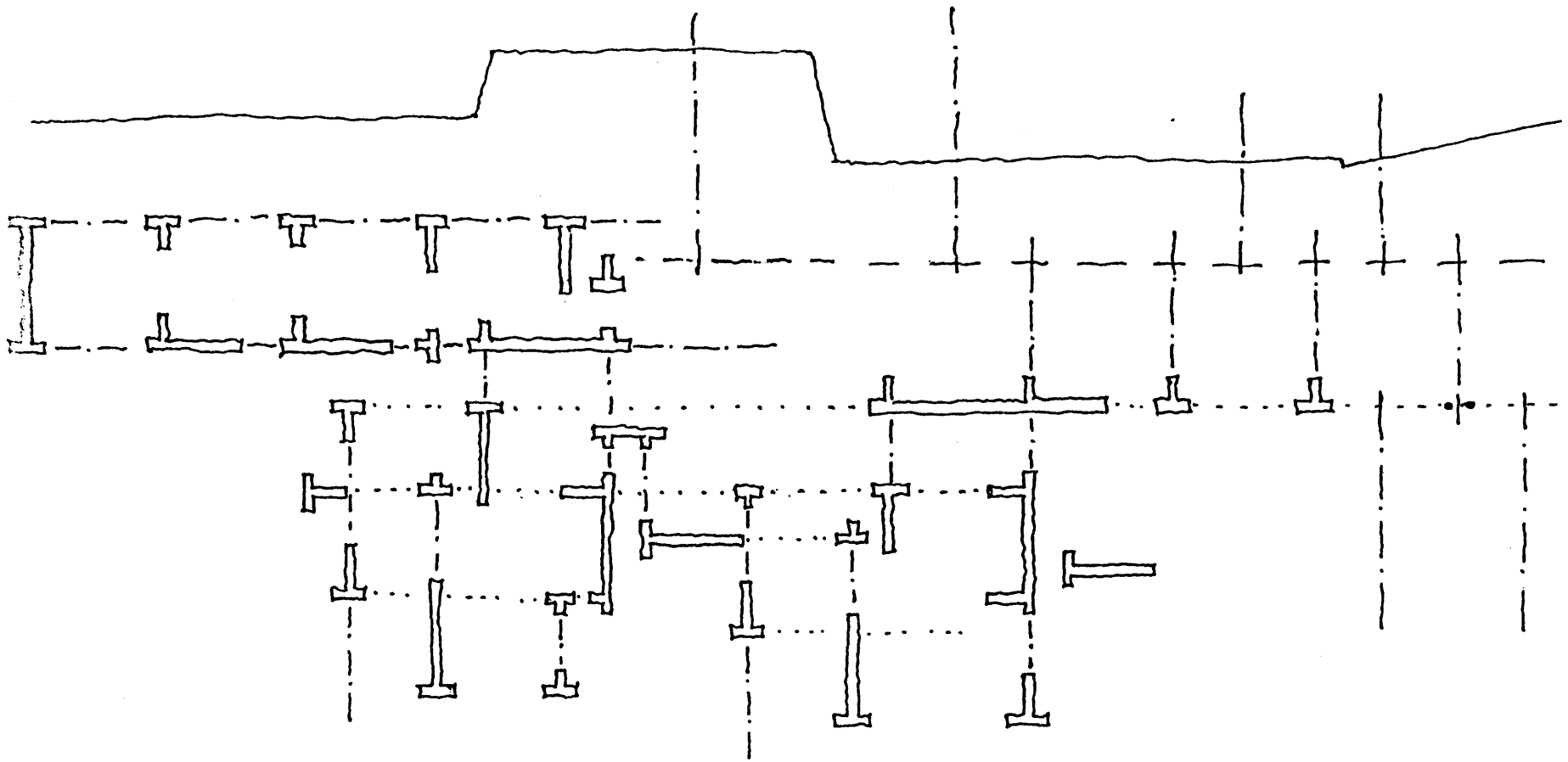


STUDY-NORTH ELEVATION

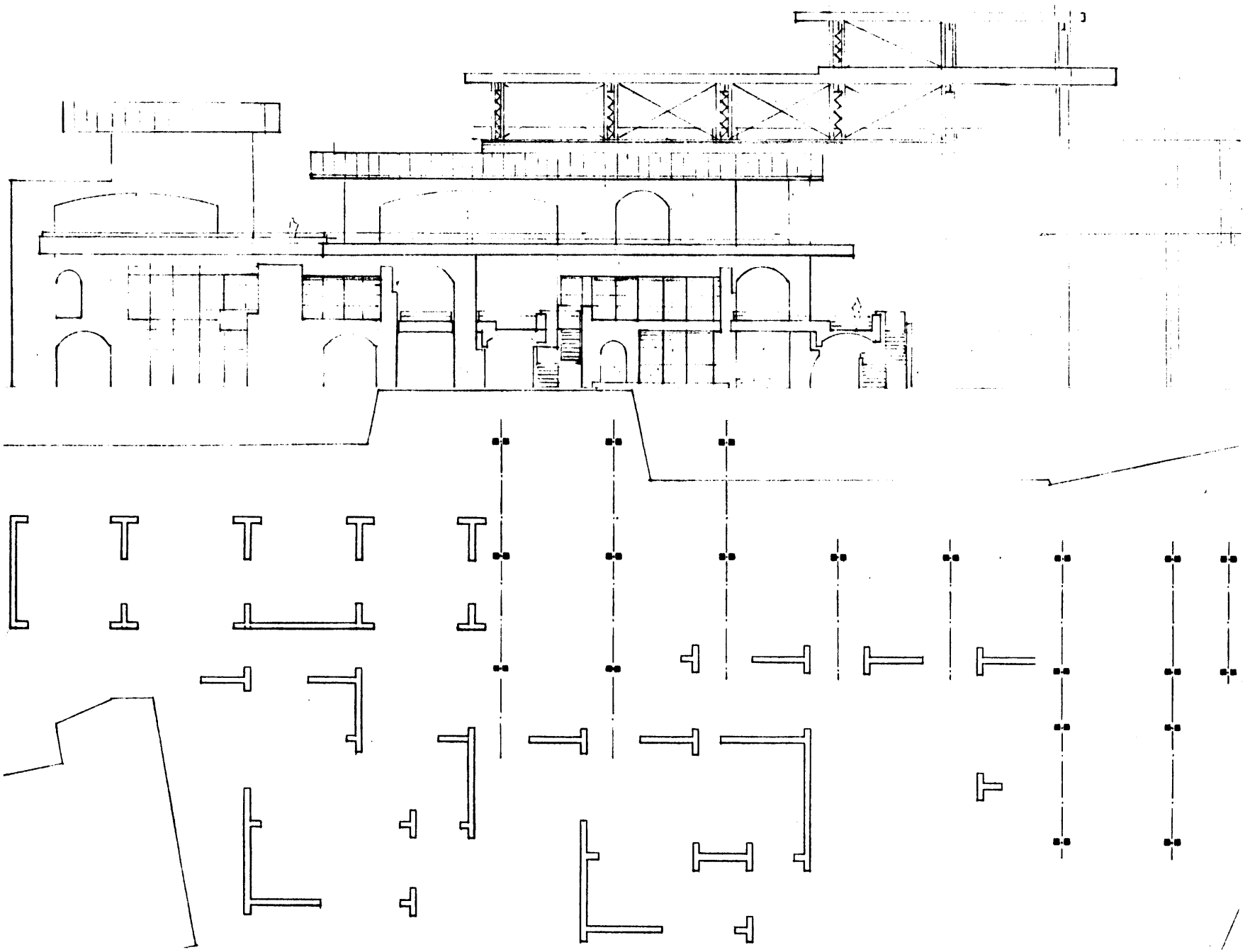
BLACKSTONE STREET 0 5 10 FT.

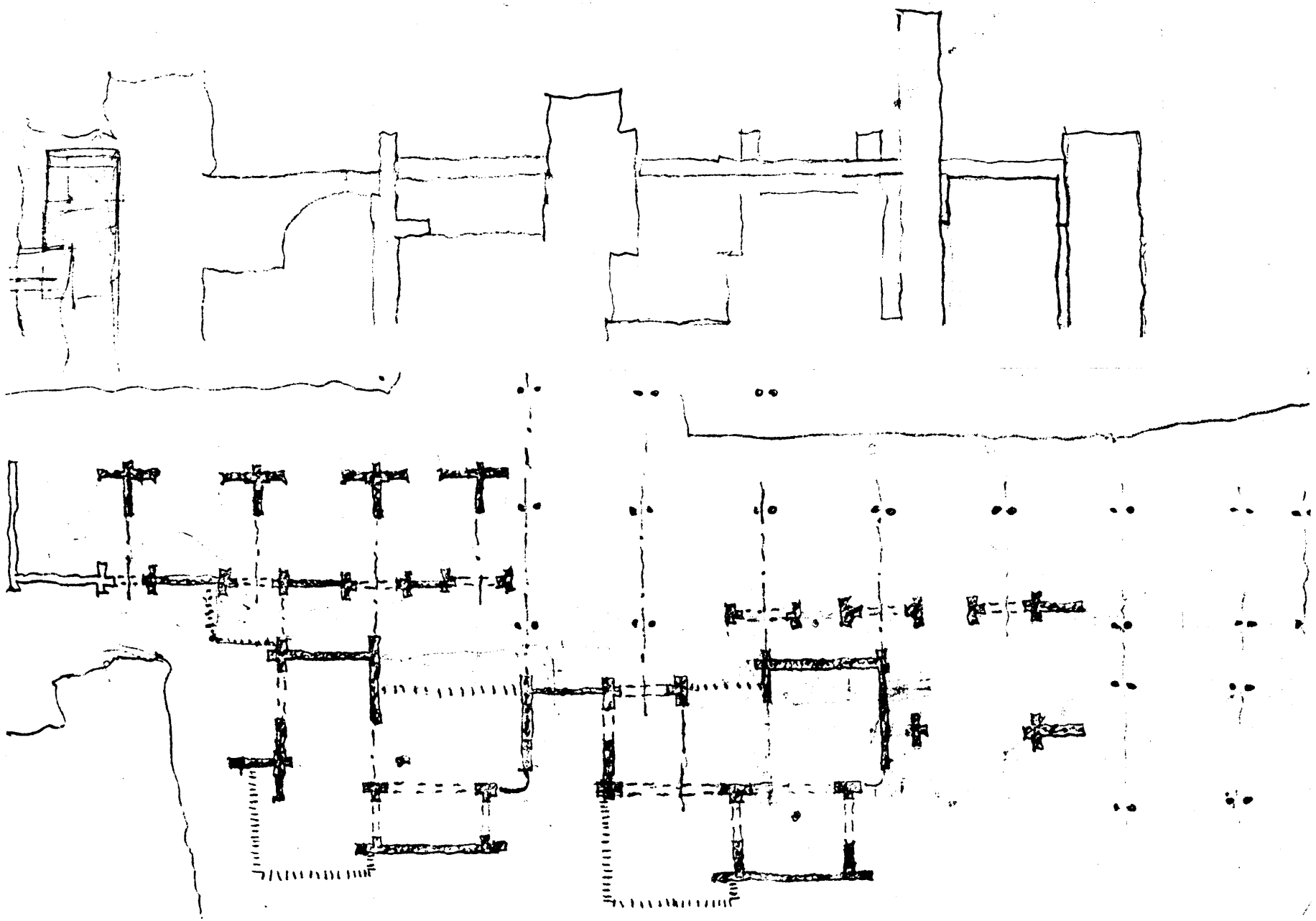


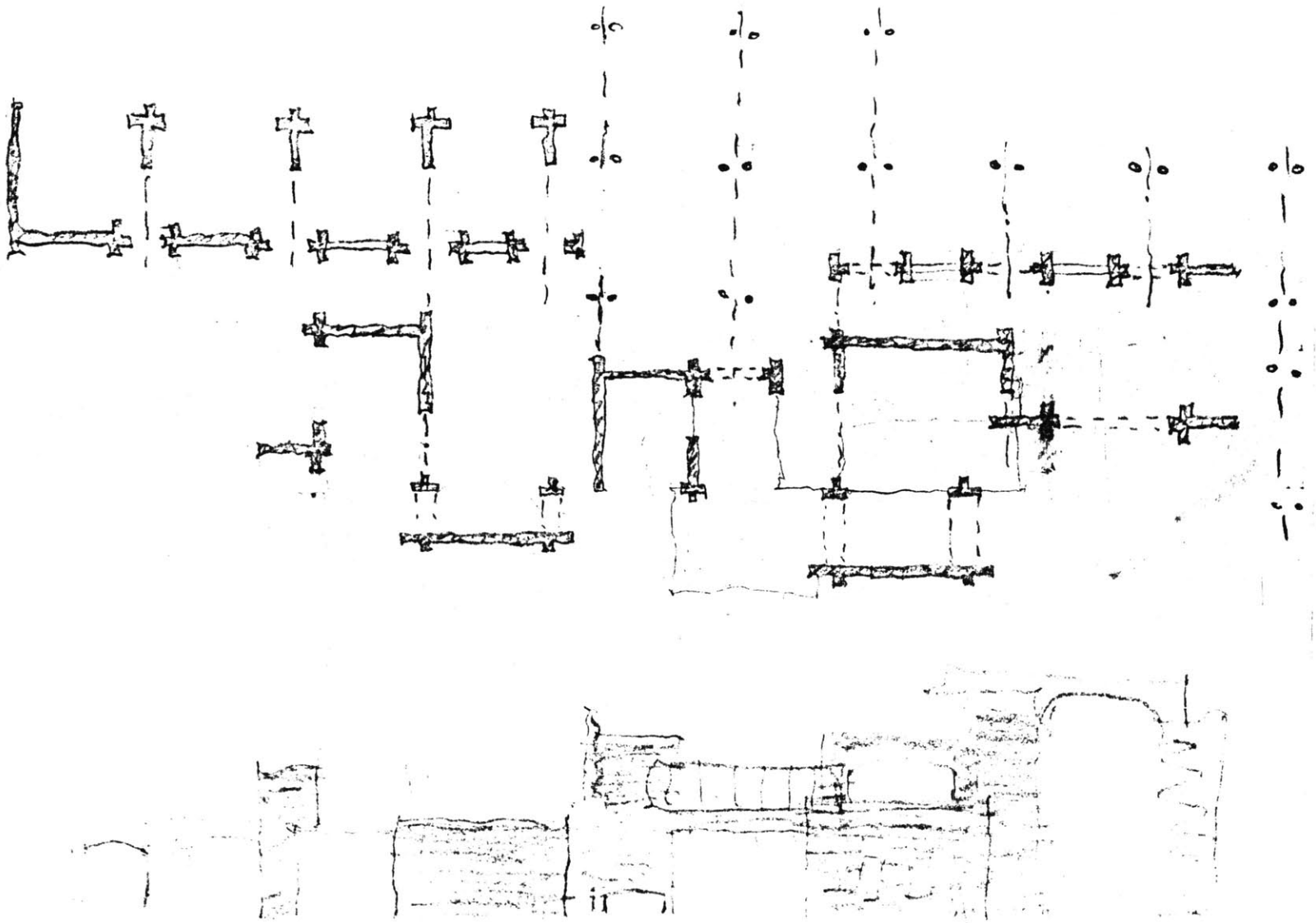
FIELD DISTRIBUTION



These studies represent a search for a systematic deployment of the physical elements. In a commercial building of this type, the size of the typical use territory is small. Based on precident in the existing shops a bay size of 20 X 20 feet was chosen. Since small bussinesses come and go, and vary in the amount of space they require, the configuration of the immovable field definitions had to accomodate aggregation and subdivision of adjacent spaces. Hence, the design as presented in section II represents but one possible inhabitation of the primary field.







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